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BENCH-SCALE BENEFICIATION TESTS
OF NEW BRUNSWICK OIL SHALE

by

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OF NEW BRUNSWICK OIL SHALE

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1.0 ABSTRACT

Oil shales from the Albert Formation in New Brunswick were studied by way of a series of bench scale beneficiation tests to determine their beneficiation potential. Tests completed include: size analysis, float-sink analysis, concentrating table, jigging tests, froth flotation, magnetic separation, air classification, and oil agglomeration tests. Attempts were made to concentrate the organic-rich fraction (for retorting) and a carbonate-rich fraction (to act as a sulphur scavenger when co-combusted with coal).

A scanning electron microscope equipped with an energy dispersive x-ray detector and digital beam control was used to characterize the mineral assemblages present in the oil shale by way of both manual and computer automated analysis. Manual surveys showed the distinct varved nature of these shales with an abundant mineral-rich fraction and a less common organic-rich fraction. Automated analysis by way of a proprietary Particle Recognition and Characterization program identified the major mineral "groups", including calcite, dolomite, ankerite, quartz, plagioclase, kaolinite and illite.

Heavy media float-sink analyses exhibited significant decreases in organic matter and increases in carbonate content as the specific gravity of the fluid increased. These trends were moderated, however, when weight recoveries were considered. Froth flotation tests also concentrated an organic fraction, but with low recoveries. Finer grinding of flotation samples did not improve concentrations possibly due to the interference of fine carbonate minerals. Carbonate minerals also appeared to interfer with oil agglomeration tests, resulting in little or no agglomerate.

A separation of organics and carbonates occurred in the air classification tests, but recoveries were too low to be of any significance. Magnetic separation tests and jigging tests were unsuccessful. Concentrating table testing proved to be the most successful technique to concentrate a carbonate-rich tails fraction.

The carbonate content of the Albert shale may have a detrimental effect on attempts to highgrade the organic fraction. Thus, removal of the carbonate-rich fraction by way of tabling or float-sink analysis prior to flotation or agglomeration tests may provide more encouraging results.

1.0 RESUME

Des schistes pétrolifères de la Formation Albert au Nouveau-Brunswick ont fait l'objet d'études par le biais d'une série d'essais d'enrichissement en laboratoire, en vue de déterminer leur potentiel de valorisation. Les essais complétés comprennent: analyse granulométrique, analyse densimétrique, table de concentration, essais de pistonnage, flottation par moussage, séparation magnétique, classification d'air, et essais d'agglomération bitumineuse. Ont été effectuées des tentatives de concentration de la fraction riche en organiques (pour la pyrogénation) et de la fraction riche en carbonates (afin d'agir comme épuiseuse de soufre lors de la co-combustion avec houille).

Un microscope électronique d'exploration muni d'un détecteur d'énergie despersive à rayons X ainsi que d'un contrôle de faisceau numérique a servi à caractériser les assemblages de minérai présents dans le schiste bitumineux par l'entremise d'une analyse à la fois manuelle et automatisée par ordinateur. Des études faites à la main ont montré la nature laminée distincte de ces schistes accompagnés d'une abondante fraction riche en minéraí et d'une fraction riche en organiques mais plus rare. L'analyse automatisée faisant usage d'un programme breveté de Reconnaissance et de Caractérisation de la Particule a identifié les "groupes" de minérai importants, y compris la calcite, la dolomite, l'ankerite, le quartz, le plagioclase, la kaolinite et l'illite.

Des analyses densimétriques de suspension dense ont mis en évidence des baisses significatives en matières organiques et des augmentations en teneur de carbonate à mesure qu'augmentait la densité spécifique du fluide. Ces tendances se modéraient, cependant, lorsqu'on considérait les récupérations de poids. Des essais de flottation par moussage concentraient aussi une fraction organique, mais à faible récupération. Un broyage plus fin des échantillons de flottation n'ont pas amélioré les concentrations, probablement à cause de l'interférence de minérais de carbonate fins. Des minérais de carbonate aussi semblaient interférer avec les essais d'agglomération pétrolifère, ayant comme résultat peu ou pas d'agglomérat.

Au cours des essais de classification d'air, une séparation des organiques et des carbonates s'est produite, mais les récupérations ont été trop faibles pour être significatives. Des essais de séparation magnétique ainsi que les essais de pistonnage n'ont pas réussi. Les essais de table de concentration se sont révélés comme étant la technique la plus réussie pour concentrer une fraction de rejet riche en carbonate.

La teneur de carbonate du schiste Albert pourrait nuire aux efforts visant l'enrichissement de la fraction organique. Par conséquent, l'enlèvement de la fraction riche en carbonate par le biais du tablage ou de l'analyse densimétrique avant les essais de flottation ou d'agglomération pourrait donner des résultats plus encourageants.

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To accompany this report are 4 volumes of additional background information that are available upon request.

New Brunswick Oil Shale Raw Analytical Results:

Volume I. Scanning electron microscopy (manual survey - control samples; automated survey - control samples, sieve fractions)
Volume II. Scanning electron microscopy (automated survey - float-sink fraction)
Volume III. Scanning electron microscopy (automated survey - concentrating table tests)
Volume IV. Scanning electron microscopy (automated survey - jigging tests)

2.0 INTRODUCTION

The Atlantic Coal Institute submitted a proposal on November 12, 1986 in response to a request for proposal from the Department of Natural Resources, New Brunswick, involving bench-scale physical beneficiation tests on New Brunswick Oil Shales.

The original proposal resulted in a contract initiated February 19, 1987, and subsequent arrival of a bulk sample of oil shale consisting of approximately 380 kg. Progress reports were submitted monthly to the Scientific Authority, Mr. Clint St. Peter and any amendments or problems were outlined in these reports.

The purpose of this study was to conduct a series of bench-scale physical beneficiation tests on a bulk sample of New Brunswick Albert Formation oil shale. Previous studies have indicated that the organic-rich shales are amenable to retorting and that carbonate-rich shales are an excellent sulphur oxide gas capturing media when co-combusted with sulphur-bearing coal. The beneficiation tests should determine if it is possible to upgrade the oil shales in organic matter or carbonate mineral content.

3.0 ACKNOWLEDGEMENTS

The authors coordinated and compiled this report, but the scope of analytical work encompased all employees of the Atlantic Coal Institute. Credit must therefore go to the following staff members:

Glynn Campbell, Helen Costello, Alexander Dove, Christine MacDonald, Mary Lou Musial, Jean Sibley, and Donna McMahon.

X-Ray Assay Laboratories acted as a subcontractor for whole rock XRF analysis. Thanks also go to Mr. Clint St. Peter for his efforts and support as scientific authority for the project.

4.0 BACKGROUND GEOLOGY

4.1 Introduction

Oil shale may be defined as a fine grained sedimentary rock containing indigenous organic matter that is mainly insoluble in ordinary petroleum solvents and from which significant amounts of shale oil can be extracted by pyrolysis (MacAuley et al., 1985). Thus, the term "oil shale" is somewhat misleading.

The Albert oil shale in New Brunswick is the most explored and documented in Canada. Attention was first directed to this area in 1849 with Abraham Gesner's discovery of Albertite (a vein hydrocarbon) at Frederick Brook near Albert Mines. Early reports such as Dawson (1855), Ells (1909), Wright (1922), Norman (1932), Timm et al. (1942), Gussow (1953) and Greiner (1962) give complete lithologic descriptions, accounts of exploratory drilling, mining of Albertite and the development of the Stoney Creek oil and gas field.

4.2 Geological Setting

The Maritimes Basin was formed as a result of extensional block-faulting and regional downwarping during the Acadian Orogeny (Middle to early Late Devonian). It consists of a series of northeast - trending horst and graben structures in which predominantly non-marine Upper Paleozoic fluviatile and lacustrine sediments accumulated (Pickerill et al., 1985).

The Albert Formation is situated within one such graben structure, referred to as the Moncton Sub-basin in southeastern New Brunswick (Figure 1). This basin is a wedge shaped structure approximately 200 km in length opening to the northeast (St. Peter, 1982). Here, the earliest basinal rocks, the Horton Group, lie unconformably on the basement complex. The Horton Group is subdivided into the basal Memramcook Formation, the medial Albert Formation, and the upper Moncton Formation (Table 1).

4.3 Depositional Environment

Norman (1932) formally defined the Albert Formation as a grey-coloured shale sequence intermediate between two red-bed sequences. Pickerill and Carter (1980) recognized seven sub-environments or facies within the Albert Formation as follows:

i. Alluvial Fan
ii. Fluvial Channel
iii. Interchannel/Overbank
iv. Marginal Lacustrine
v. "Shallow" Lacustrine
vi. Deep Lacustrine
vii. Nearshore Bar/Beach Complex

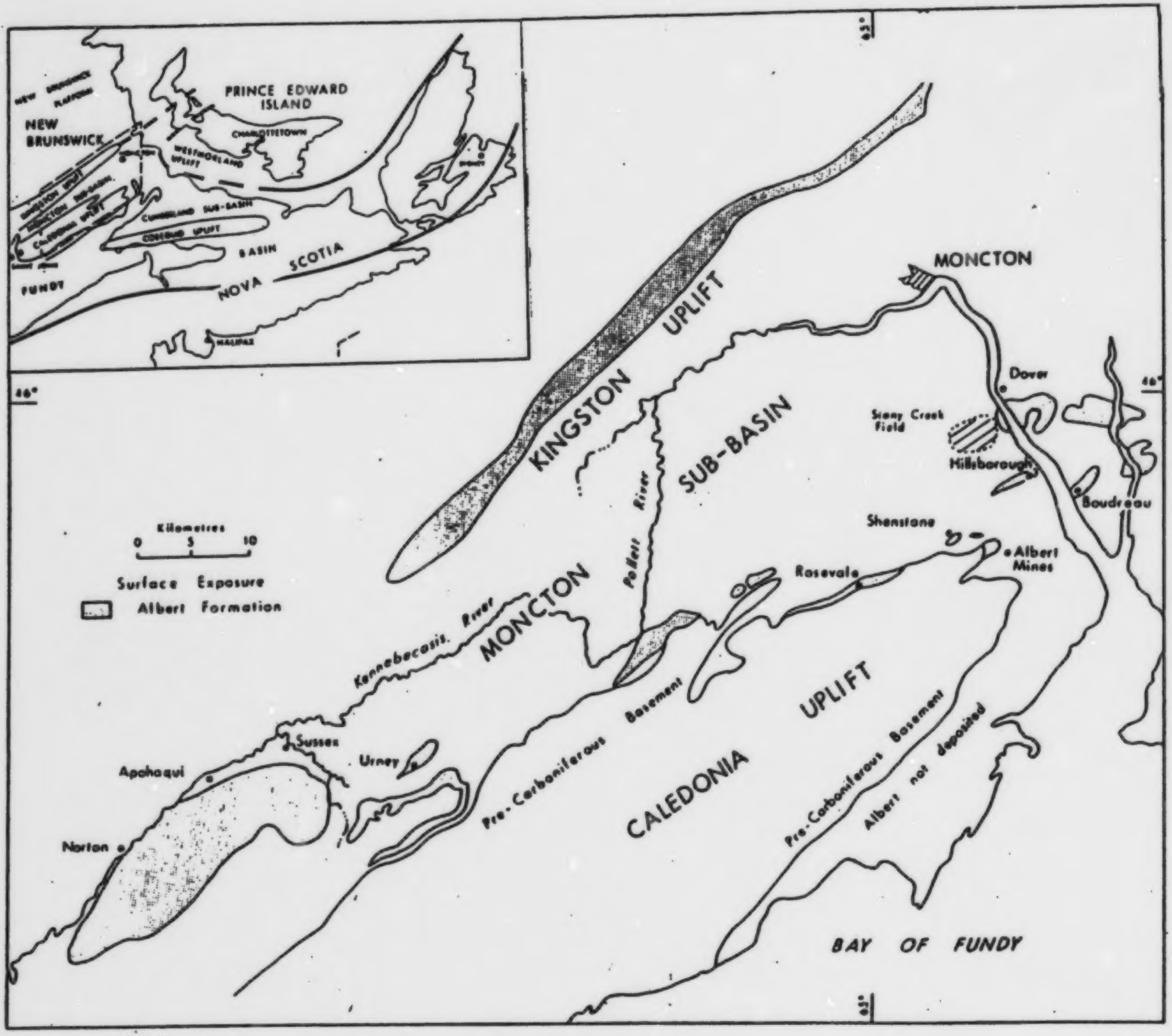
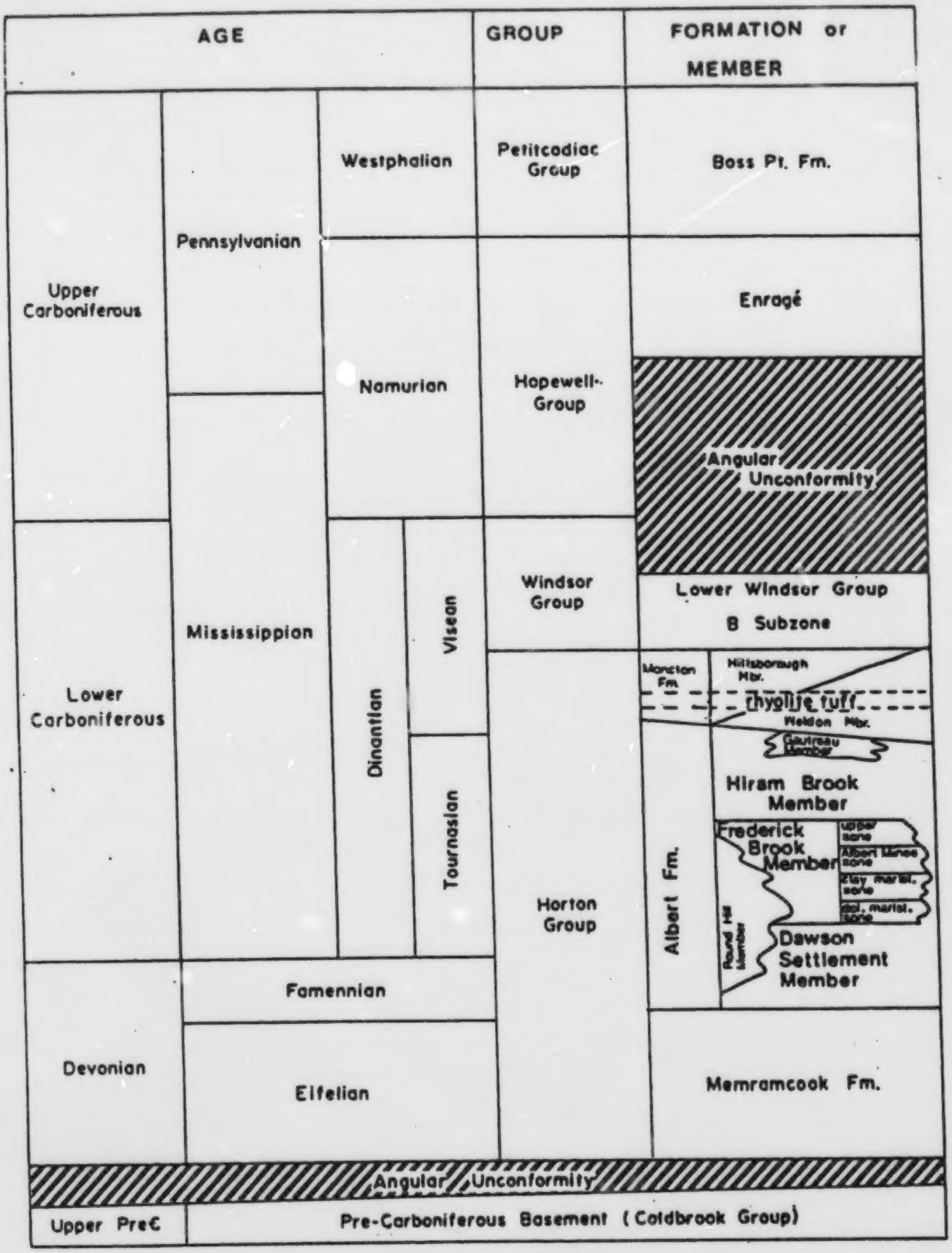

NEW BRUNSWICK PLATFORM
NEW BRUNSWICK
PRINCE EDWARD ISLAND
CHARLOTTETOWN
WESTMORLAND UPLIFT
KINGSTON UPLIFT
MONCTON SUB-BASIN
CALEDONIA UPLIFT
CUMBERLAND SUB-BASIN
COBEQUID UPLIFT
BASIN
NOVA SCOTIA
FUNDY
HALIFAX
SYDNEY
46°
65°
MONCTON
Dover
Stony Creek Field
Hillsborough
Boudreau
Shenstone
Albert Mines
Rosevale
KINGSTON
UPLIFT
SUB-BASIN
MONCTON
Pollett River
Kennebecasis River
CALEDONIA
UPLIFT
Pre-Carboniferous Basement
Pre-Carboniferous Basement
Albert not deposited
Sussex
Urney
Apohaqui
Norton
BAY OF FUNDY
Kilometres
0
5
10
Surface Exposure
Albert Formation

FIGURE 1. Tectonic elements of the Maritimes Basin (inset map) and Albert Formation outcrop distribution within the Moncton sub-basin-Kingston Uplift, N.B. (after MacAuley and Ball, 1982)



AGE				GROUP	FORMATION or MEMBER
Upper Carboniferous	Pennsylvanian	Westphalian		Petitcodiac Group	Boss Pt. Fm.
		Namurian		Hopewell Group	Enragé
	Mississippian				Angular Unconformity
Lower Carboniferous		Dinantian	Visean	Windsor Group	Lower Windsor Group B Subzone
				Horton Group	Moncton Fm. Hillsborough Mbr. rhyolite tuff Weldon Mbr.
			Tournasian		Albert Fm. Gautreau Member Hiram Brook Member Frederick Brook Member: upper zone, Albert Mines zone, clay marlst. zone, dol. marlst. zone Round Hill Member Dawson Settlement Member
Devonian	Famennian				
	Eifelian				Memramcook Fm.
Angular Unconformity					
Upper Pre€	Pre-Carboniferous Basement (Coldbrook Group)				

TABLE 1. Stratigraphic nomenclature in the Moncton sub-basin (after Smith, 1985)

Pickerill and Carter (ibid) emphasized the intergradational nature of these sub-environments in both time and space. The lacustrine facies contains the well-known oil shales of the Frederick Brook Member (Greiner, 1962).

King (1963) interpreted the depositional environment of the oil shales to be below wave base at an interface relatively undisturbed by organisms as evidenced by the formation and preservation of fine laminae and the fine grained nature of the sediment. A highly reducing environment is suggested by the abundance of organic matter and well preserved fish remains. The presence of pyrite also suggests a reducing environment. The carbonate rich varves may be the result of precipitation through photosynthetic activities of planktonic algae or the association of carbonate-bearing waters with the stagnant bottom water.

5.0 BENEFICIATION OF OIL SHALE

Beneficiation techniques have long been utilized in the mineral and coal industries to obtain an upgraded product. Retorting of oil shales involves heating or pyrolyzing the entire rock. Only a small fraction of oil shale (approximately 12%, Datta and Salotti, 1982) consists of kerogen, the source of oil and/or gas products. A concentration of kerogen prior to retorting may cut down on retort capital and operating costs assuming the separation is cost efficient.

Separation of oil shales into an organic-rich fraction (kerogen) and a mineral-rich fraction was attempted as early as 1920 by Dolbear. Since then, investigations have been made into oil shale beneficiation by numerous authors, many of whom worked with eastern and western oil shales of the United States. Separations were based on differences in properties of kerogen and mineral matter such as: density, grain size, surface characteristics, electrical and magnetic properties.

Datta and Salotti (1982) completed a series of beneficiation tests on eastern oil shales including sizing, electrostatic separation, magnetic separation, density separation, oil agglomeration and froth flotation with very little success. They concluded that the amorphous kerogen is so intimately mixed with mineral matter that it would require extremely fine grinding to liberate.

Ring (1981) also investigated dry separations using electrostatic properties with low separation efficiencies. He did, however, determine that wettability separations (agglomeration, flotation) are twice as efficient as density separations.

Flotation experiments have been conducted by many authors including Lamont and Hanna (1982, 1983), Kirshnan et al. (1983), Misra et al. (1984), and Tsai and Lumpken (1984). Kirshnan obtained good results on relatively coarse particles (>100 um) but found that fine particles were highly hydrophobic and could not be wetted easily. Lamont and Hanna (ibid), on the other hand, successfully upgraded eastern United States oil shales by ultrafine grinding (-10 um) prior to flotation. They suggested that with continuing engineering advancements in beneficiation equipment and recent advances in fine particle technology, fine grinding is technically and economically practical. Misra et al. (1984), used high temperature grinding (88°C), followed by flotation to improve liberation of kerogen from oil shales. At elevated temperatures, the mobility of kerogen particles increased and the coalescence of kerogen particles occurred. This was measured using an IBAS Image Analyzer.

Oil shales from the Stellarton Basin in Nova Scotia were examined for their beneficiation potential by Rockwell (1985). Tests were completed using a Wifley table, heavy liquid separations, flotation and oil agglomeration/brine flotation. Separations were obtained with the gravity and oil agglomeration/brine flotation tests but other tests produced less encouraging results.

Brown and Abbott (1981) attempted to concentrate a kerogen rich fraction of the Albert oil shale of New Brunswick using size and gravity separations, spherical agglomeration and flotation tests. Gravity separations provided the best results but with low recoveries. They had little success when they attempted oil agglomeration and froth flotation and recommended that further work be carried out on larger samples of Albert shale.

6.0 ANALYTICAL PROGRAMME

6.1 Bulk Sample Procurement

The New Brunswick Department of Natural Resources provided Three-D GeoConsultants Limited with a contract to procure a bulk sample of oil shale from the Albert Formation in New Brunswick. The three tonne sample was collected on September 10, 1986 from two major pits in the Albert Mines deposit site (Figures 2a and 2b). Thirty, 6.5 imperial gallon buckets of oil shale were collected from the large "test pit" opened by Canadian Occidental Petroleum Limited for the supply of oil shale to the New Brunswick Electric Power Commission. Twenty-nine, 6.5 imperial gallon and two, 3.5 imperial gallon buckets were collected from the pit opened by the New Brunswick Department of Natural Resources, Pit #1 (Ball, 1986).

Twelve buckets representing oil shale from both pits were received by the Atlantic Coal Institute for characterization and beneficiation tests in January of 1987.

6.2 Preparation of Test Samples

The bulk sample of approximately 380 kg was air dried for 96 hours at room temperature. Nine splits were taken across the pile for moisture analysis prior to drying.

After drying, the sample was thoroughly homogenized and quartered (Figure 3). Two quarters were retained and sealed under nitrogen for storage. One quarter was dry sieved at screen sizes 2", 1", 1/2", 4 mesh (Tyler), 10 m, 48 m, 200 m, and 400 m to give a total of 8 sieve fractions plus the -400 m pan fraction. The coarser fractions (2" to 4 mesh) were sieved using a Soil Test Engineering Vibratory Screen Unit, Model CL-370C with 16" x 16" screens and a screening time of 3 minutes. The finer fractions (10 to 400 mesh) were sieved using Tyler Canadian Standard Sieve Series 8" diameter testing sieves and an Endecotte model EVS1 sieve shaker with a screening time of 3 minutes. Results from analysis of the sieve fractions are tabulated and plotted in Appendix I B.

After sieving, each fraction was weighed and the weight percent calculated (Table 1, Appendix I B). A split for analysis was taken from each screen fraction, crushed in a Straub Model 4E grinding mill and then pulverized using a Holmes Model 300 pulverizer. A split for float-sink analysis was also taken from each screen fraction and the remaining sample was archived for future reference.

FIGURE 2a. Bulk oil shale sample location map for Canadian Occidental Test Pit (from Ball, 1986).

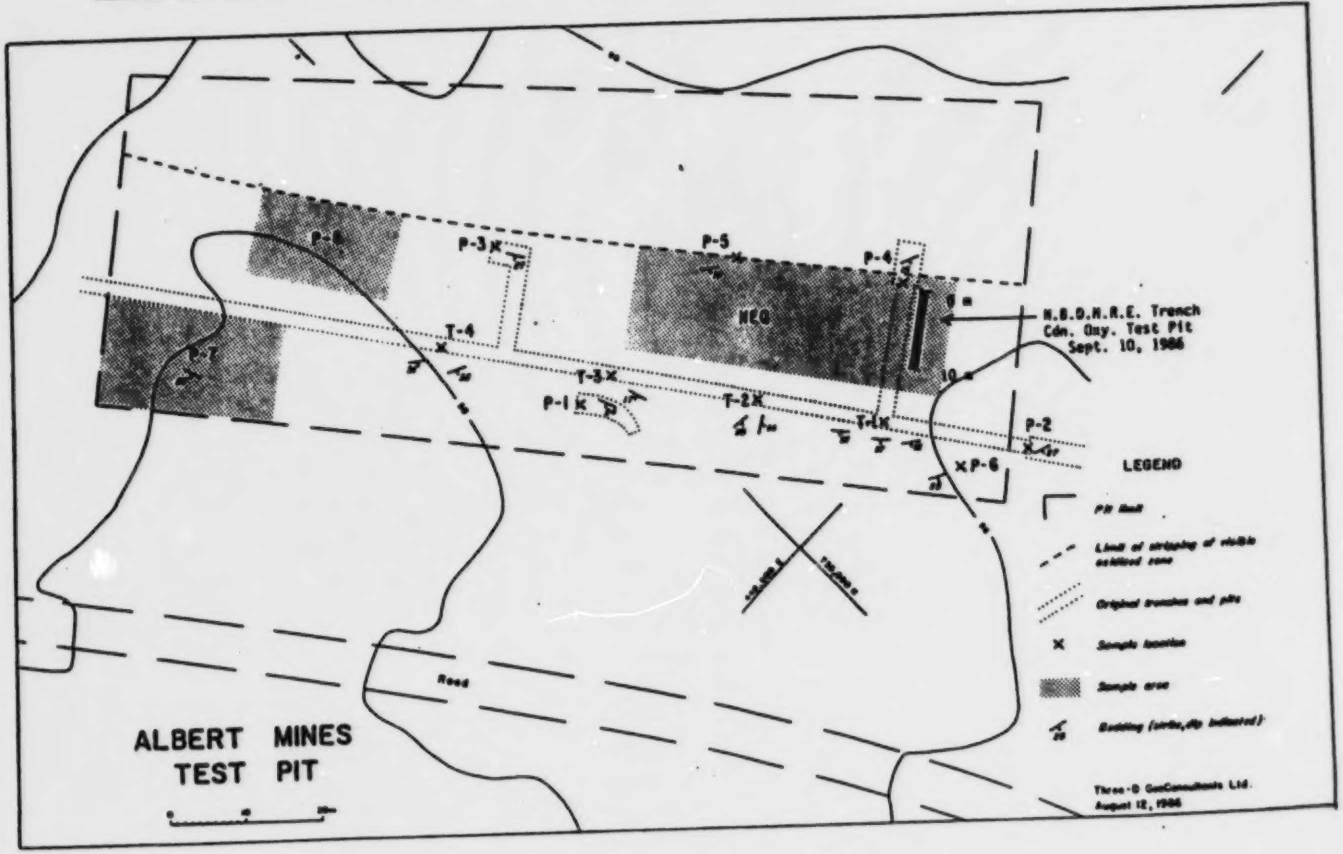
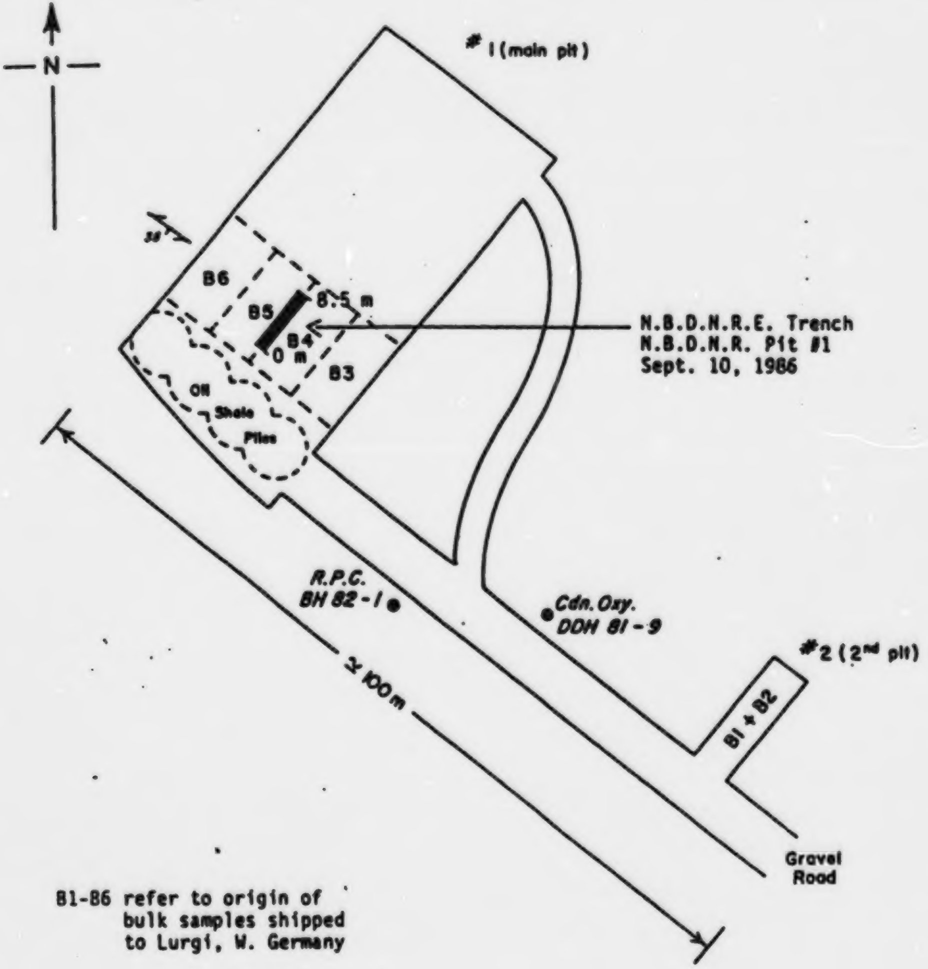

P-6
P-7
P-3
T-4
T-3
P-1
P-5
NEO
T-2
P-4
T-1
9 m
10 m
P-2
P-6
N.B.D.M.R.E. Trench
Cdn. Oxy. Test Pit
Sept. 10, 1986
LEGEND
Pit limit
Limit of stripping of visible oxidized zone
Original trenches and pits
Sample location
Sample area
Bedding (strike,dip indicated)
Road
ALBERT MINES
TEST PIT
Three-D GeoConsultants Ltd.
August 12, 1986

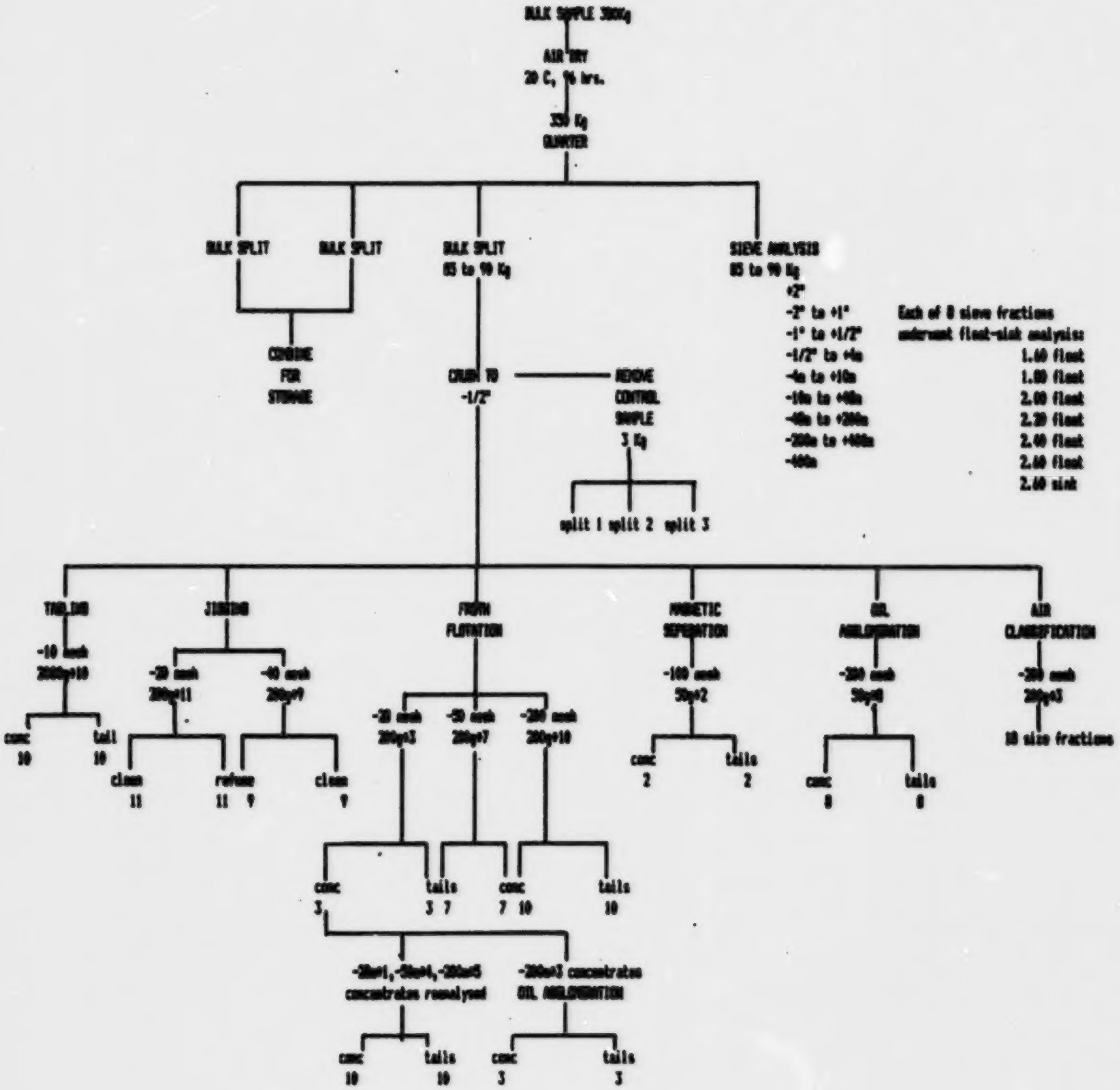
FIGURE 2b. Bulk oil shale sample location map for N.B.D.N.R. Pit #1 (from Ball, 1986).


N
# 1 (main pit)
38°
B6
B5
B4
B3
8.5 m
0 m
Oil Shale Piles
N.B.D.N.R.E. Trench
N.B.D.N.R. Pit #1
Sept. 10, 1986
R.P.C. BH 82-1
Cdn. Oxy. DDH 81-9
≈ 100 m
#2 (2nd pit)
B1 + B2
Gravel Road

B1-B6 refer to origin of
bulk samples shipped
to Lurgi, W. Germany

Three-D GeoConsultants Ltd.
September, 1984

Figure 3. Flow chart of bulk sample and subsamples for oil shale beneficiation tests.


BULK SAMPLE 380Kg
AIR DRY
20 C, 96 hrs.
350 Kg
QUARTER
BULK SPLIT
BULK SPLIT
BULK SPLIT
85 to 90 Kg
SIEVE ANALYSIS
85 to 90 Kg
+2"
-2" to +1"
-1" to +1/2"
-1/2" to +4m
-4m to +10m
-10m to +40m
-40m to +200m
-200m to +400m
-400m
Each of 8 sieve fractions
underwent float-sink analysis:
1.60 float
1.80 float
2.00 float
2.20 float
2.40 float
2.60 float
2.60 sink
COMBINE
FOR
STORAGE
CRUSH TO
-1/2"
REMOVE
CONTROL
SAMPLE
3 Kg
split 1
split 2
split 3
TABLING
-10 mesh
2000g#10
conc
10
tail
10
JIGGING
-20 mesh
200g#11
-40 mesh
200g#9
clean
11
refuse
11
refuse
9
clean
9
FROTH
FLOTATION
-20 mesh
200g#3
-50 mesh
200g#7
-200 mesh
200g#10
conc
3
tails
3
tails
7
conc
7
conc
10
tails
10
-20m#1,-50m#4,-200m#5
concentrates reanalysed
conc
10
tails
10
-200m#3 concentrates
OIL AGGLOMERATION
conc
3
tails
3
MAGNETIC
SEPERATION
-100 mesh
50g#2
conc
2
tails
2
OIL
AGGLOMERATION
-200 mesh
50g#8
conc
8
tails
8
AIR
CLASSIFICATION
-200 mesh
200g#3
10 size fractions

The last quarter of the sample was crushed to -1/2" using a Denver Jaw Crusher Type H. This crusher had a 2 1/4" x 3 1/2" opening and was powered by a 1 HP motor at 350-450 rpm. An AC ampmeter attached to the crusher indicated the amount of energy required to crush the sample. The energy required to reduce the sample from 2" to -1/2" was 62 kWh/tonne.

A split of approximately three kilograms was riffled from the -1/2" bulk sample and divided into three fractions labelled Control samples numbers 1, 2 and 3. Representative subsamples were taken from each control sample and pulverized for analysis. The analytical results obtained from the control samples were used for comparison with the results of all beneficiation tests (see Appendix I A). The remaining 1/2" bulk sample was split and crushed to the following size fractions for beneficiation testing:

Test Type	**Tyler Mesh Sizes**
Jigging Test	-20, -40
Concentrating Table	-10
Froth Flotation	-28, -50, -200
Magnetic Separation	-100
Agglomeration	-200
Air Classification	-200

6.3 Beneficiation Test Procedures

6.3(1) Float-Sink Analysis

A modification of the CANMET procedure EMP 67/142 (Picard and Rozenhart, 1966) was employed for the float-sink tests. A split from each of 8 screen fractions was separated into the following specific gravity fractions: 1.60 float, 1.80 float, 2.00 float, 2.20 float, 2.40 float, 2.60 float, and 2.60 sink. Heavy liquids with a specific gravity of less than or equal to 2.00 were prepared using commercially available Certigrav heavy liquids. Specific gravities heavier than 2.00 were prepared with mixtures of tetrachloroethylene and bromoform. The float-sink tests for the +48 mesh material was separated in 2.5 liter steel beakers while 1 liter separatory funnels were used for the fine fractions. The specific gravity of each liquid was tested before each sample run and adjusted if necessary. Samples were dried by heat lamp between gravity runs to avoid fluid contamination. Float sink data for each screen fraction is tabulated and plotted in Appendix I C.

6.3(2) Concentrating Table

Testing was carried out using a Model #13 Wilfley concentrating table. The deck was rubber covered, partially riffled with pine and measured 1.27m long X 0.61m wide. The tilt of the table was adjustable longitudinally and transversely. The use of slipper bearings in the mounting of the deck allowed for the reciprocal motion of the table. The table was driven by a 1/3 HP motor by the mechanism described in Figure 4.

When the feed was introduced to the table, the flow of wash water and the table motion caused a segregation of particles between the riffles in the following sequence:

(1) Small dense particles at bottom
(2) Large dense particles intermediate
(3) Small light particles near top
(4) Large light particles at top

The motion of the table caused the particles to be spread across the deck in a fan-like pattern with the dense particles being shuffled along the riffles to the longitudinally lower end of the table while the lighter particles washed transversly over the riffles. The distribution of the table products is shown in Figure 5. The separation point between the heavy and light material was placed about 250 mm from the lower end of the table.

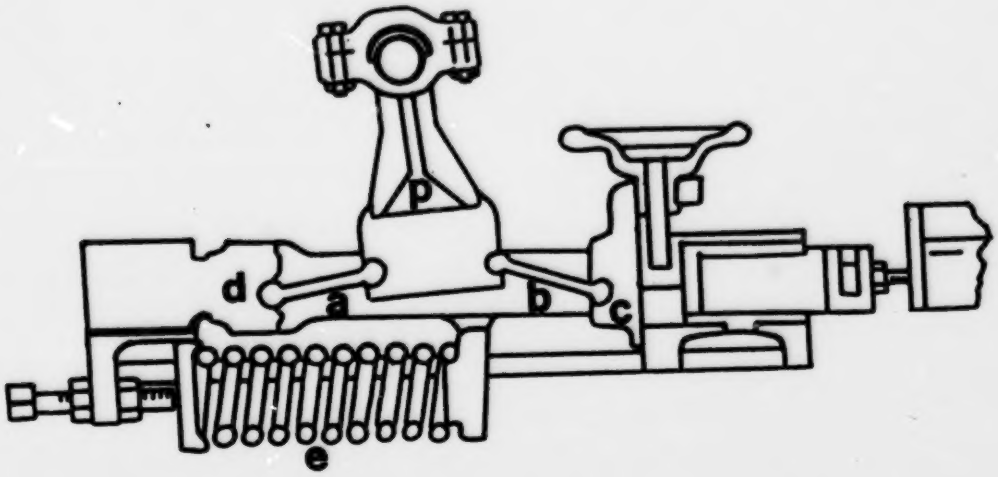
Ten representative bulk splits were crushed to -1/4" x 28 mesh for testing. After the initial test run, it was discovered that this size fraction was too large for efficient separation so the samples were crushed to -10 mesh. The -10 mesh fraction yielded improved separation. Testing was carried out varying stroke lengths, wash water flow rates, and longitudinal and transverse tilts. The parameters for each test are listed in Table 1, Appendix I D.

Ten 2 kg samples were fed to the table as a 25% solids by weight slurry via an hydraulic classifier. The slurry was fed to the table at approxiamtely 250 grams of solids per minute. The products collected were filtered in a Denver pressure filter and the filter cake was dried for 3 hours at 110°C and weighed. Recovery percentages and analytical results for each test are tabulated and plotted in Appendix I D.

6.3(3) Jigging Test

A Denver mineral jig was used to carry out jig testing. In the Denver jig, separation of minerals of different specific gravity was accomplished in a bed fluidized by a pulsating

FIGURE 4. - Head Motion of Wilfley Table



The head motion of a standard Wilfley concentrating table consists of two toggles driven by a pitman (p). The back toggle (b) is seated against a fixed mounting (c), while the front toggle (a) bears on yoke (d) connected to the table deck. The system is held together by a spring (e) and driven by the eccentric and pitman. At the beginning of the forward stroke, the toggles are flattened out, and the spring is compressed. As the pitman rises, the toggles steepen out, and are at their most acute angle at the top of the stroke where the table reaches maximum speed. As the pitman descends, the toggle angle flattens out and the direction of the table is abruptly reversed. (B.A. Wills, 1981).

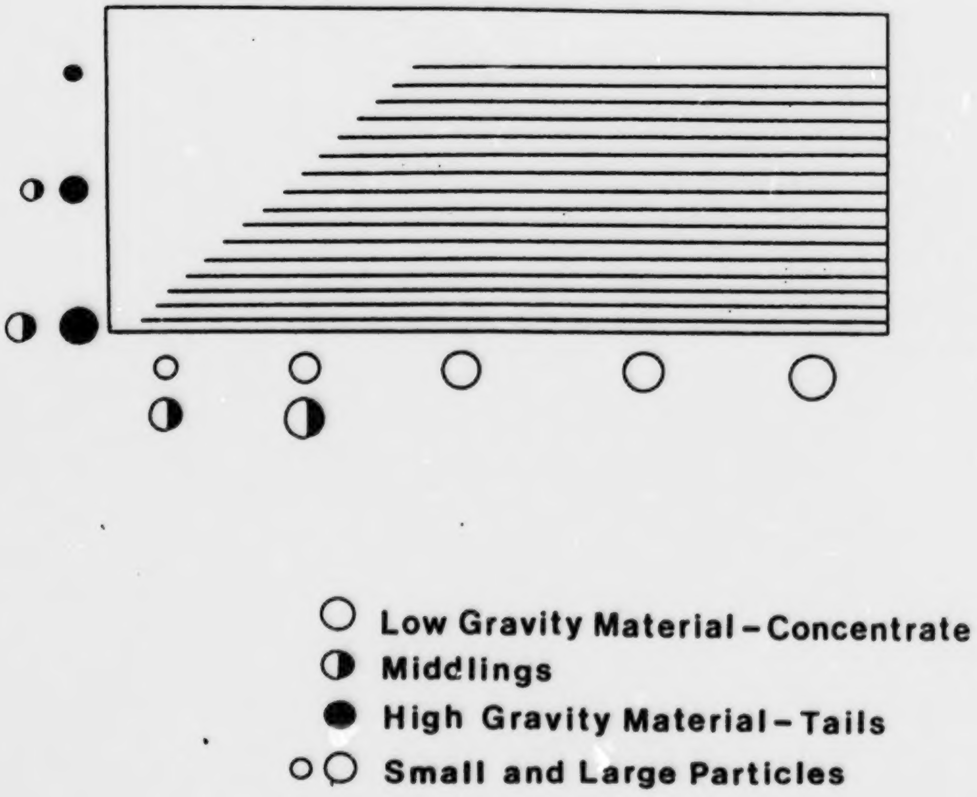


FIGURE 5. Idealized Distribution of Concentrating Table Products

○ Low Gravity Material - Concentrate
◑ Middlings
● High Gravity Material - Tails
○○ Small and Large Particles

current of water so as to produce a density stratification of the sample material.

The bed material was placed on a screen in the jigging compartment. The jig was then filled with water, and the water intake valve to the jig adjusted so that it would be open only on the up-stroke of the plunger (Figure 6.) The jig was then turned on, and a sample of approximately 200 grams was slowly introduced as a 25% solids-by-weight slurry. The water intake valve set-up as described provided pulsation to the bed material and sample on the down stroke of the plunger with no water being admitted to the jig. The pulsation dilated the bed material and as the stroke neared the point of reversal, heavy particles began to settle through the dilated bed, while lighter particles washed over the top of the jig where they were collected. At the point of stroke reversal, water was admitted to the jig cancelling the vacuum produced by the upward stroke of the plunger. The incoming water hindered the settling rate of the particles. On the next downward stroke of the plunger, the bed was dilated again and the heavy material (settled in the previous stroke) passed through the bed and screen into the hutch compartment.

Twenty tests were performed on oil shale samples weighing approximately 200 grams. Nine of the samples were crushed to -40 mesh, and eleven to -20 mesh material. Parameters, such as the length of plunger stroke, water flow rate and bed material, were changed for each test. Control parameters and recovery rates are listed in Table 1, Appendix I E. Analytical data on the refuse (heavier) and the clean (lighter) shale obtained from the tests are tabulated and plotted in Appendix I E.

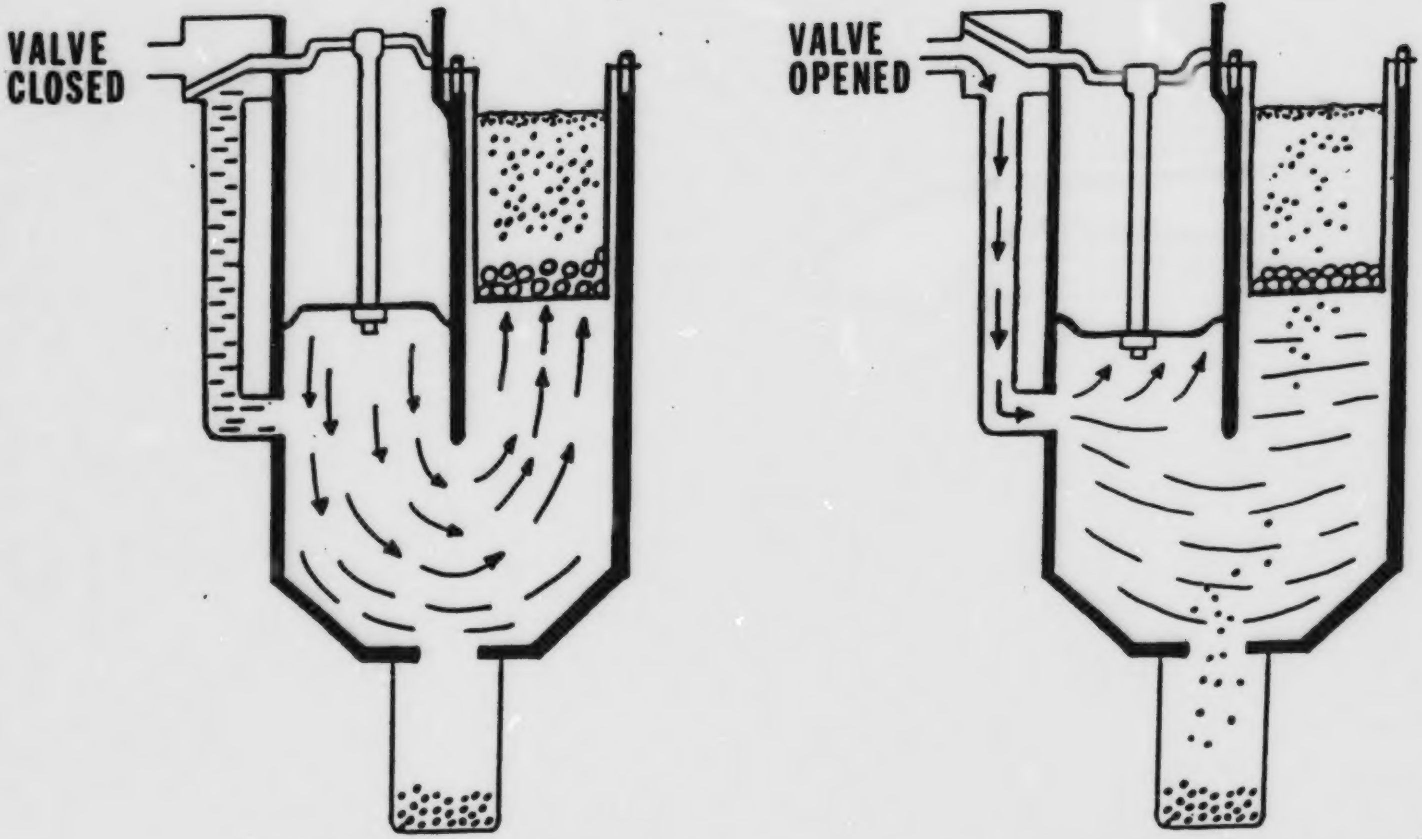
6.3(4) Froth Flotation

Flotation utilizes the different physical and chemical surface properties of minerals to affect separations. Two main types of reagents are used in flotation: frothers and collectors.

The function of the frother is to form stable bubbles from air that is introduced into the flotation cell. Collectors, which are specific for certain minerals, make the particles hydrophobic so that bubbles attach to them more readily and carry them to the surface of the floation cell to form a concentrate.

Particle size is an important factor in flotation. If particles are too large, the bubbles of the froth will not support them. In addition, the desirable concentrate may not be liberated from the gangue if the particle size is too large.

FIGURE 6.- Schematic Jigging Action of the Denver Mineral Jig


VALVE CLOSED
VALVE OPENED

START OF DOWN STROKE

START OF UP STROKE

The size fractions tested by froth flotation were: 3 samples at -28 mesh, 7 samples at -50 mesh and 10 samples at -200 mesh. Concentrates from ten of these samples were refloated; these included 1 sample at -28 mesh, 4 samples at -50 mesh and 5 samples at -200 mesh.

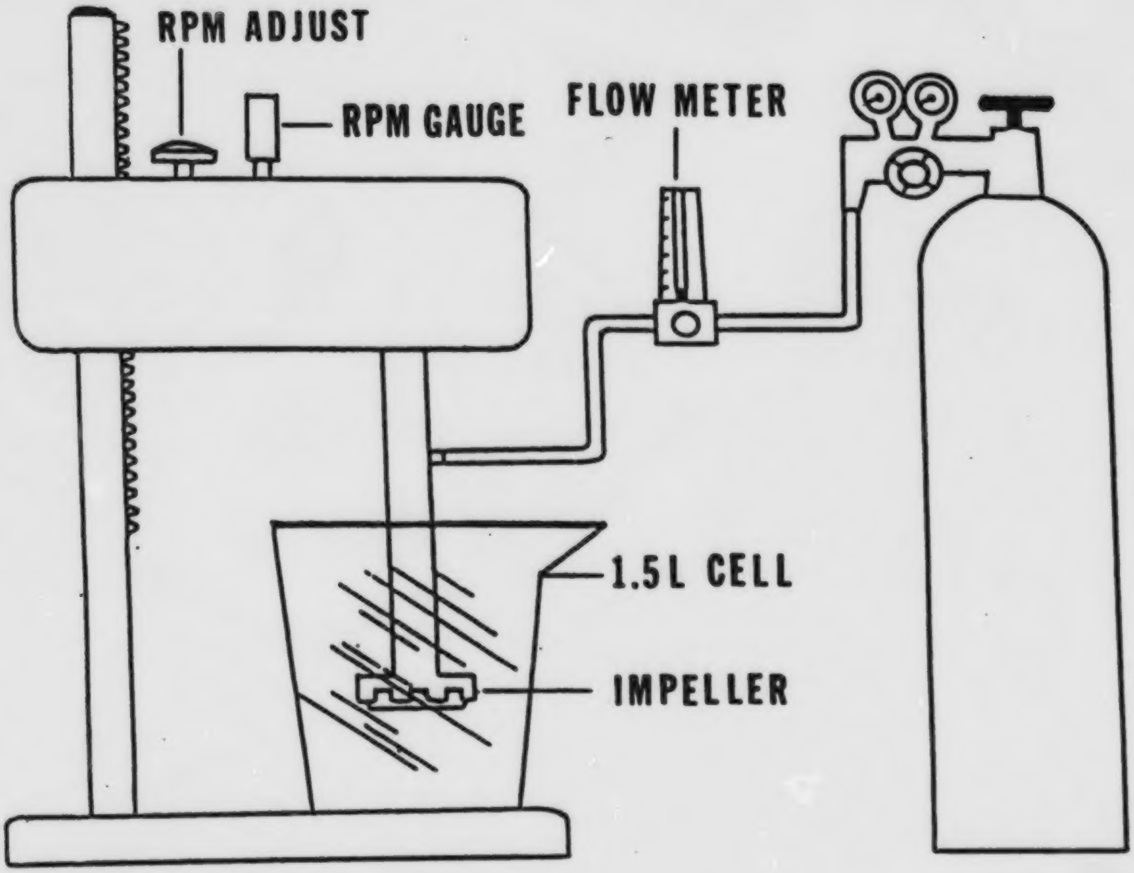
Frothers used were Methyl Isobutyl Carbinol (MIBC), Cresylic Acid, Pine Oil, and Aerofroth 65. Collectors used were Diesel Fuel, Kerosene, Aerofloat 15, Aerofloat 31, Aerodri 100, and Xanthlate. The frother and collector dosages and test control parameters are listed in Tables 1 A, 1 B, 2 A, 2 B, Appendix I F.

Tests were carried out using a Denver laboratory flotation machine with a 1.5 litre cell (Figure 7). Enough sample was added to the cell to give the required pulp density. The cell was then filled with water and the impeller turned on. The impeller was run at 900 rpm for 5 minutes to completely wet the sample. Aeration to the cell was controlled by a flowmeter connected to a compressed air cylinder. After 5 minutes of aeration, the collector was added, and 2 minutes thereafter, the frother was added. The complete slurry was then agitated for 2 minutes, and the air cylinder turned on to form the froth. Retention times varied from 3 to 15 minutes with froth removal every 60-90 seconds. The concentrate and tails fractions were pressure filtered and the filter cakes dried at 110°C for three hours. Recovery percentages for each test and analytical results for the products are tabulated and plotted in Appendix I F.

6.3(5) Magnetic Separation

Ten representative splits of the oil shale bulk sample were crushed to -100 mesh for magnetic separation tests. A Dings DMTT magnetic separator with a field strength of 6000 gauss was used. This instrument consisted of a 54 cm long glass tube open at both ends with a water inflow port near the top and a clamped hose attached to the bottom. The glass tube was mounted on a mechanical agitation device which rocked the tube at a 42° angle between the poles of an electromagnet located 14 cm from the tube's discharge end. The tube was filled with water to a height of 45 cm, and the electromagnet and agitation devices were switched on. A 50 g, -100 mesh sample was slowly added to the tube as a 25% solids-by-weight slurry. When the tube was full the discharge clamp was opened and the water inflow rate adjusted to maintain a constant level in the tube. Magnetic material stayed suspended between the poles of the magnet while the non-magnetics were washed out of the tube. After the sample was completely washed through, the magnet was shut off and the

FIGURE 7. - Schematic Equipment Set-up for a Denver Laboratory Flotation Machine


RPM ADJUST
RPM GAUGE
FLOW METER
1.5L CELL
IMPELLER

magnetic material was washed out of the tube as a concentrate. Only two samples were tested by the magnetic separation procedure because less than 0.1% magnetics were obtained in each run. The sample control parameters and analytical results of the two tests are tabulated in Appendix I G.

6.3(6) Air Classification

A model "C" Denver Air Classifier was used for air classification tests. Air classification is a means of sizing particles too fine-grained to be accurately sieved. Triplicate tests were carried out on -200 mesh material to determine if organic-rich or carbonate-rich grains were concentrated in very small particle sizes. Figure 8 illustrates the air classifier apparatus. A sample of approximately 250g was placed in the feed hopper. Valve V was set to 10 and valve M set to 0. Valve V and M are graduated from 0 to 30 with 0 being closed and 30 being completely open. The conveyor and blower were then switched on, and the sample gradually fed to the classifier. With the mesh valve M set to 0, there was very little upflow into the collector bin; and only the finest fraction was removed. The coarse sample from flask D was then re-introduced to the feed hopper, and the test repeated at M=2, M=4, M=6 and M=8. With increasing upflow, successively larger particles were carried over to the collector bin.

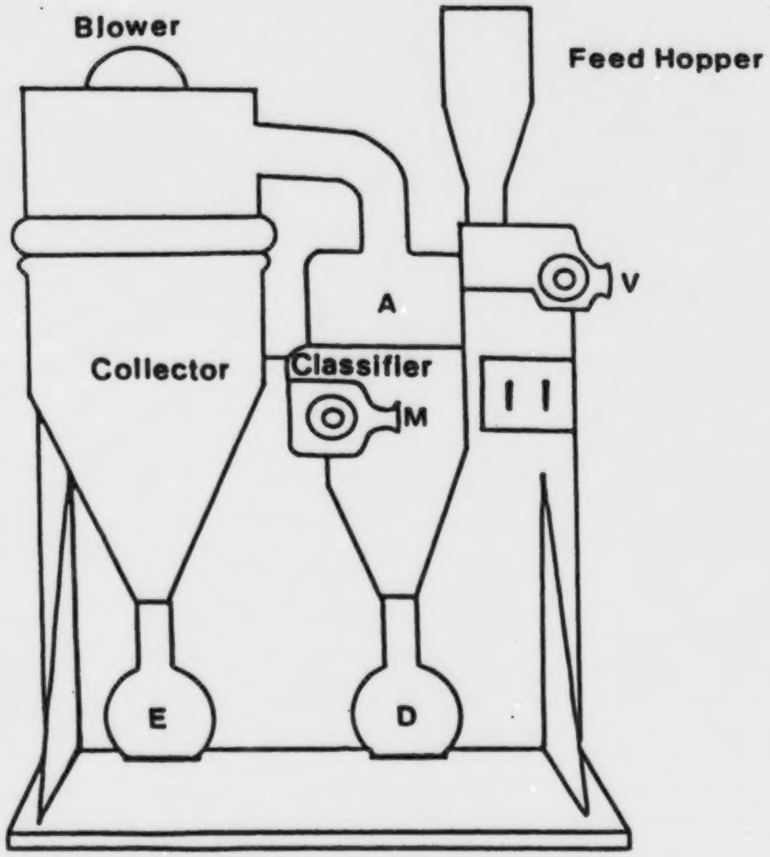
After classification tests were completed, the products were sized microscopically. This was carried out by calibration of the microscope cross-hairs with a stage micrometer. Five fields of view were chosen from each fraction and five particles were measured in each field of view. The weight percentages, particle sizes, and analytical test results are tabulated and plotted in Appendix I H.

6.3(7) Oil Agglomeration

Oil agglomeration tests were carried out using a Waring commercial blender with 1000 ml capacity and a variable transformer to control the speed of the blender. Eight -200 mesh bulk samples and three -200 mesh flotation concentrate splits were tested. Due to low recoveries, agglomeration tests were discontinued. Sample weights ranged from 15.0 g to 50.0 g depending upon the pulp density selected. The collectors used in the tests were #2 fuel oil, varsol, and kerosene. Hydrochloric acid, sulphuric acid, and Darvan #4 dispersant were used as conditioning agents.

The sample plus the correct amount of water and conditioning agents to give the required pulp density were added to the blender. The variable transformer was set to 50 v and the slurry agitated for 10 minutes as a conditioning stage.

FIGURE 8. - Schematic Equipment Set-up For the Model "C" Denver Air Classifier


Blower
Feed Hopper
V
A
Collector
Classifier
M
E
D

The primary opening on the feed duct is pressure valve (V). The air used to control the size of particles delivered to flask (E) enters the classifier (A) countercurrently through the graduated mesh valve (M). The coarse fraction collects in flask (D) and the fines in flask (E). The greater the opening setting on Valve (M), the coarser the particles that can be separated.

After conditioning, the collector was added and the variable transformer set to 110 v. resulting in thorough mixing. After two minutes at 110 v, the transformer was turned down to 50 v and the sample agitated for 10 additional minutes.

The contents of the blender were then poured on a 100 mesh screen that was previously moistened with water. The concentrate or agglomerate remained on the screen, and the tails passed through the screen. Both were filtered and dried in an oven at 50°C for 72 hours. A list of the parameters for each test and the analytical results are tabulated in Appendix I I.

6.4 Mineralogy - S.E.M.-E.D.X.-P.R.C. (Particle Recognition and Characterization)

6.4(1) Sample Preparation

Polished pellets were prepared by mixing a pulverized split of each oil shale sample with graphite in a 70/30 ratio. The graphite acted as a matrix and provided a good background when setting S.E.M. brightness levels for the mineralogical analysis. Acrylic leucite powder was added to the mixture which was then placed in an automatic Metaserv mounting press. The resultant 25 mm pellet was then ground using 320, 400 and 600 grit adhesive backed grinding papers attached to Metaserv grinding laps. This was followed by two polishing stages, first with polishing cloth and 0.3 um alumina powder suspended in distilled water, and then with double layered silk and 0.05 um alumina powder suspended in distilled water. This procedure resulted in a fine polished surface suitable for microscopic examination.

The sample was placed in a dessicator overnight and then coated with an electroconductive layer of carbon using a Polaron Sputter Coater equipped with a refrigerated stage. This provided the sample with a conductive coating and prevented beam charging when examined under the scanning electron microscope.

6.4(2) Scanning Electron Microscopy

(a) Introduction

A Jeol T-300 scanning electron microscope was used to analyze the mineralogy of splits of oil shales from the control samples and beneficiation tests. The S.E.M. is equipped with a Tracor Northern TN-5500 X-ray microanalyzer system, digital beam control, and proprietary software for automated analysis. Each polished pellet was placed in the sample chamber with a working distance of 20 mm and accelerating voltage of 20 kv. After initial focus imaging and stigmation corrections in the secondary electron image mode, the backscatter electron detector was activated. This detector measures backscatter electrons which are a function of the atomic number of the mineral...the brighter the grain, the higher the atomic number of the mineral.

(b) Manual Survey

A manual survey was conducted on the three control samples to identify the mineral suite present in the shale. Mineral assignments were based on morphology and major element microanalysis. This information was used to program chemical classes into the Particle Recognition and Characterization Program (PRC) and establish thresholds and operational parameters. Pellets of the three control samples were prepared at a particle size of -60 mesh. The pellets were scanned and photomicrographs were taken with Polaroid PN55 film at 90 second exposures on a high resolution 2000 line CRT. Pellets prepared in this way gave mineralogical information but in order to determine the mineral/kerogen association, a pellet of Control sample number 3 was also prepared from -20 mesh material, as is routinely done in coal petrography. Appendix I J. contains selected photomicrographs and matching energy dispersive X-ray spectra for the control samples.

(c) Automated Analysis

A proprietary PRC (Particle Recognition and Characterization) software program was used in conjunction with digital beam control to locate and size mineral grains for one hundred and sixteen samples.

Particle detection was based on comparing a digitized video signal from the instrument (the backscatter electron signal) to the upper and lower threshold values. The thresholds were set manually, the lower threshold set just above the brightness of kerogen and the upper threshold set at maximum. The beam scanned an area and when the video signal fell between threshold values a particle was detected, the center located and a set of eight rotated diameters about the center were measured. Values for the average diameter, maximum and minimum diameters, crude area and perimeter for each particle were calculated and stored. After the initial size determination was completed, the beam was repositioned to the particle center and an EDX acquisition was run for two seconds. Twenty-five regions of interest (Table 2) were then inspected for net counts in order to chemically characterize the particle.

Table 2
Regions of Interest

Na
Mg
Al
Si
P
S
Cl
K
Sn
Ca
Ti
Ce
Ba
Cr
Mn
Fe
Co
Ni
Cu
Zn
Hg
As
Pb
Sr
Y

Fifty-eight minerals (chemical types) were defined by name for comparison to each particle EDX. Table 3 contains a complete listing of all mineral categories in the PRC program designed for oil shales. This list was based on reported mineralogy of oil shales from numerous publications as well as results from the manual survey. Chemical characteristics for each mineral were based on the range of mineral chemistry quoted in Dana (19th Edition) and the following mineral standards: Astimex, Chemplex and Ward Scientific Standards. Mineral overlaps are outlined in Table 4 and should be considered when interpreting S.E.M. data. Multiple frame average sizes and diameter histograms were accumulated for each of the 58 types as well as for all types, non-integrateable (not enough X-rays to characterize particles) and unknown particles (mixed chemistries, minerals not included in the program). Appendix I K contains interpretative tables of mineral classes compiled on IBM-PC.

Weight percentages were calculated using the number of particles in each category, the average area, and the specific gravity of the mineral as in the formula below. Non-intergrated and unknown categories were not included in this calculation.

$$\text{calculated weight \%} = \frac{(N. * P.A. * S.G.)}{T.A.}$$

where: N. = number of particles for a specific mineral
P.A. = particle area for a specific mineral
S.G. = specific gravity of mineral
T.A. = total area; Sum of N. * P.A. * S.G. for all minerals

Mineral weight percentages calculated in this way should only be taken as rough approximations.

TABLE 3. Particle Recognition and Characterization data for minerals commonly reported in oil shales

#	MINERAL CLASS:	IDEAL FORMULA:	Mean At. No.	Specific Gravity
1	Bischofite	MgC12.6H20	5.04	1.59
2	Gypsum*1	CaS04.2H20	7.33	2.32
3	Kaolinite*8	A14Si4010(OH)8	7.65	2.60
4	Kieserite	MgS04.H20	7.77	2.57
5	Magnesite*23	MgC03	8.40	3.01
6	Montmorillonite	(Ca,Na)(Al,Mg)4(Si,Al)8020(OH)4	9.01	2.35
7	Talc*3	Mg3(Si4010)(OH)2	9.04	2.75
8	Dolomite	CaMg(C03)2	9.20	2.85
9	Szomolnokite*2	FeS04.H20	9.33	3.19
10	Jarosite	KFe3(OH)6(S04)2	9.50	3.20
11	Staurolite	FeA14Si2010(OH)2	9.71	3.75
12	Illite*4	K(Al,Fe)4(Si,Al)8020(OH)4	9.78	2.70
13	Calcite*5.	CaC03	10.00	2.71
14	Polish*6	A1203	10.00	4.02
15	Quartz*7	Si02	10.00	2.65
16	Chlorite*9	(Mg,Fe)6AlSi3010(OH)8	10.11	3.00
17	Tourmaline	Na(Mg,Fe)3A16(B03)3(Si6018)(OH)4	10.17	3.13
18	Plagioclase*29	(Ca,Na)A12Si208	10.26	2.69
19	Biotite*27	K(Mg,Fe)3AlSi3010(OH)2	10.41	3.00
20	Hornblende*24	NaCa2(Mg,Fe,Al)5(Al,Si)8022(OH)2	10.43	3.20
21	Malachite*15	Cu2C03(OH)2	10.60	4.05
22	Microcline*10	KAlSi308	10.61	2.56
23	Goethite*11	HFe02	10.75	4.37
24	Diopside*22	CaMgSi206	10.80	3.25
25	Ankerite*25	Ca(Mg,Fe,Mn)(C03)2	10.89	3.01
26	Hypersthene*22	(Fe,Mg)2Si206	11.00	3.30
27	Rhodochrosite	MnC03	11.00	3.69
28	Epidote*24	Ca2(Al,Fe)3Si3012(OH)	11.16	3.45
29	Siderite*12	FeC03	11.20	3.96
30	Apatite*14	Ca5(P04)3.OH	11.36	3.15
31	Augite*22	(Ca,Na)(Mg,Fe,Al)(Si,Al)206	11.85	3.30
32	Sphene	CaTiSi05	12.00	3.50
33	Almandine	Fe3A12Si3012	12.10	4.32
34	Andradite*24*25	Ca3Fe2(Si04)3	12.50	3.75
35	Rutile*13	Ti02	12.67	4.35
36	Psilomelane	BaMn9016(OH)4	13.09	4.20
37	Strontianite	SrC03	13.60	3.70
38	Halite	NaCl	14.00	2.16
39	Celestite	SrS04	14.33	3.96
40	Xenotime	YP04	14.33	4.59
41	Ilmenite	FeTi03	14.40	4.79
42	Sulphur*18	S	16.00	2.07
43	Witherite	BaC03	17.20	4.30
44	Barite	BaS04	17.33	4.50
45	Monazite	(Ce,La,Y,Th)P04	17.50	5.00
46	Sylvite	KCl	18.00	1.99
47	Pyrite*20	FeS2	19.33	5.02
48	Linnaeite	Co3S4	20.71	4.80
49	Chalcopyrite*21	CuFeS2	21.75	4.30
50	Cassiterite	Sn02	22.00	7.00
51	Millerite	NiS	22.00	5.50
52	Sphalerite	(Zn,Fe)S	22.00	4.05
53	Zircon*16	ZrSi04	23.33	4.30
54	Realgar*17	AsS	24.50	3.56
55	Arsenopyrite	FeAsS	25.00	6.07
56	Pentlandite*19	(NiFe)9S8	36.11	5.00
57	Cinnabar	HgS	48.00	8.09
58	Galena*28	PbS	49.00	7.60

TABLE 4. EDX isomers and peak overlaps from TABLE 3; mineral standards and control conditions for the Particle Recognition and Characterization program (PRC).

#1 anhydrite
#2 melanterite, pyrrhotite
#3 serpentine
#4 muscovite, sericite, microcline, orthoclase
#5 fluorite,aragonite
#6 boehmite, diaspore, gibbsite, corundum, chrysoberyl
#7 opal, chalcedony, cristobalite
#8 nacrite, halloysite, topaz, kyanite
#9 penninite, chamosite, clinochlore
#10 orthoclase, illite overlap
#11 magnetite, hematite, lepidocrocite
#12 goethite overlap
#13 anatase
#14 collophane, phosphorite
#15 azurite
#16 P-Zr overlap
#17 orpiment
#18 Mo overlap
#19 bravolite
#20 marcasite
#21 covellite, bornite, chalcocite
#22 pyroxenes, hornblende overlap
#23 poor resolution
#24 andradite, epidote and hornblende overlap
#25 low Si - ankerite/andradite overlap
#26 augite overlap
#27 muscovite, illite overlap
#28 low Pb - realgar overlap
#29 analcime, zeolite

MINERAL STANDARDS:

1. Astimex
2. Chemplex
3. Ward Scientific
4. In-house

CONDITIONS:

1. Grains > 0.5um.
2. Kev = 20.
3. Carbon coated samples.
4. Assume Si,Fe artifacts.
5. Monitor 25 elements.
6. Organic minerals, graphite not detectable.
7. Excludes most hydrated sulphates.

7.0 ANALYTICAL TECHNIQUES

7.1. Proximate Analysis

A Fisher Model 490 Coal Analyser was used to determine the ash, moisture, volatiles and fixed carbon content of oil shale samples. Approximately one gram of -60 mesh shale was weighed into a fused quartz crucible to the nearest 0.1 mg. The sample was then placed in a drying oven at 107°C for 1 hour, cooled and reweighed. The residual moisture content was calculated from the difference in weight before and after drying.

The crucible and dry shale were covered with self-sealing quartz covers and placed in the analyzer muffle furnace at 600°C. The sample was heated to 950°C at the rate of 35°C per minute and maintained at 950°C for 7 minutes. The sample was cooled to room temperature and reweighed. The difference between the dry shale and the residue after heating to 950°C was used to calculate the volatile matter content. The volatile matter determined was a function of both the organic matter and carbonate content of the shale.

The ash content was determined by placing the crucible and residue in the cold muffle furnace and heating to 750°C at the rate of 35°C per minute until a constant weight was reached. The crucible was cooled to room temperature and reweighed. The difference in weight between the dry shale and the ash product is used to calcualte the ash content.

The fixed carbon content is calculated using the following equation: FC = 100% - (% volatiles + % ash + % moisture). Proximate analysis results are tabulated in Appendix I.

7.2. Ultimate Analysis

For carbon, hydrogen, nitrogen, and oxygen analysis, approximately 0.8 mg of standards and samples were weighed into tin (for CHN) and silver (for O) capsules using a Mettler UM3 Ultramicrobalance. The samples were then loaded into the autosampler of the 1106 Carlo Erba Elemental Analyzer from which they dropped at preset times into a combustion tube.

- CHN

The combustion tube for CHN analysis was maintained at 1030°C. The constant flow of helium through the tube was temporarily enriched with oxygen for flash combustion as each sample dropped. The combustion gases were reduced by passing them over copper at 650°C. The resulting gases were then separated in a Porapak QS chromatographic column maintained at 100°C into N_2, CO_2, and H_2O.

- OXYGEN

The combustion tube for oxygen analysis was maintained at 1060°C. A constant flow of helium carried the pyrolysis gases into a 5°A Molecular Sieve chromatographic column maintained at 100°C which separated the gases into N_2, CH_4, H_2, and CO.

At the end of the chromatographic column, a TCD detector produced an electrical signal proportional to the concentration of the gas. This signal was then passed on to a Spectra Physics 4270 integrator which calculated the area under the curve. The concentration was then calculated using the following equation:

(1) K-FACTOR CALCULATION

The K-Factor was calculated for each element according to the following equation:

$$I' = I - B$$

$$K = \frac{\%\,t \times WS}{I'}$$

where: $\%\,t$ = Theoretical percentage of the standard
WS = Weight of the standard in mg
I' = Net integral area
I = Standard integral
B = Blank integral

(2) PERCENTAGE CALCULATION

The percentage of each element to be determined was calculated according to the following equation:

$$\% = \frac{K \times I}{W}$$

where: K = Average factor of each element
I' = Net integral area
W = Weight of the sample in mg
I = Sample integral
B = Blank integral

- SULPHUR

The total sulphur content was determined using a Leco SC32 sulphur analyzer. Initially samples were run routinely by weighing approximately 0.3g of shale sample into a combustion boat, and placing it into the combustion furnace of the SC32. After approximately two minutes of combustion, a value for total sulphur in weight percent was generated on a Leco 780-400 integrator.

Values for sulphur were very low, generally less than 0.50%, and it was suspected that all the sulphur was not being burned off. Attempts were made to ensure complete combustion of the shale by adding approximately one gram of vanadium pentoxide (V_2O_5) as an accelerator. This resulted in considerably higher values when compared to previous analyses. The table below outlines total sulphur results from sieve fractions with and without vanadium pentoxide. It was decided to continue analyzing all shale samples with the accelerator to ensure complete combustion of the sample.

Sieve Fractions

	S wt% without V_2O_5	S wt% with V_2O_5
+2"	0.09	0.36
-2" to +1"	0.32	1.10
-1" to +1/2"	0.08	0.75
-1/2" to +4m	0.28	0.70
-4m to +10m	0.18	0.60
-10m to +48m	0.19	0.56
-48m to +200m	0.23	1.29
-200m to +400m	0.24	1.43
-400m	0.18	1.13

7.3. Gross Calorific Value

The calorific value of the samples was determined using a Digital Data Systems CP500 Isothermal Calorimeter in accordance with ASTM designation D3286-82. A 0.5 g sample of shale was burned in an oxygen bomb under 3000 kPa of oxygen. The shale was ignited and a temperature rise, representative of the calorific value, was measured. The calorific value was calculated by a microprocessor in the instrument and was directly reported in Btu/lb. This value was corrected for sulphur as per ASTM D3286-82 when sulphur values were available.

Problems were encountered with samples of low heating value as they would not fire under routine test conditions. It was necessary to spike such samples with a highly combustible material of known calorific value. Initial experiments involved spiking the samples with benzoic acid with erratic results. A coal standard was then used according to the following procedure:

(1) Approximately 0.25 g of sample was mixed with 0.25 g of coal.
(2) The calorific value of the coal sample was then entered in the calorimeter memory as a correction factor.
(3) The entire sample weight was then entered and the bomb fired.
(4) The LED readout on the sample then showed the calorific value of the sample corrected for spiking.

The coal spiking procedure gave much more consistent results than the benzoic acid procedure. All samples that had been spiked are noted in data tables with a single quotation mark (').

7.4. Rock-Eval and Total Organic Carbon Analyses

A Delsi Oil-Show Analyzer was used to determine Rock-Eval and total organic carbon (T.O.C.) results on various shale splits. Rock Eval results include:

- S_0 peak: Free hydrocarbons (gas) present in the rock in mg/g
- S_1 peak: Free hydrocarbons (oil) present in the rock in mg/g
- S_2 peak: Residual petroleum potential (hydrocarbon compounds resulting from cracking of kerogen) in mg/g
- S_4 peak: Quantity of organic CO_2 produced during catalytic oxidation of residual organic matter in CO_2/g rock.
- T_{max}: Temperature at the peak maximum of S_2 in °C
- T.O.C.: Total Organic Carbon determined using the following calculation: $TOC = (0.82 + (S_1+S_2) + S_4)/10$
- OPI: Oil production index determined using the following calculation: $S_1/(S_0+S_1+S_2)$
- H.I.: Hydrogen index determined using the following calculation: $HI = 100 \times S_2/T.O.C.$

Results were compared with an in-house shale standard calibrated against a Delsi source rock standard (certified by the Institute Francais du Petrole (IFP), Paris, France). The standard was checked at the beginning and end of each run, and was acceptable within 5% of the certified value.

The samples were run using the following parameters:

1. Pyrolysis Cycle: Helium gas purge at 90°C for 2 minutes.
   300°C initial isotherm for 2 minutes
   30°C/min. temperature gradient
   600°C final oven temperature
2. TOC Cycle: 600°C for 5 minutes under air atmosphere.
3. Attenuation Scale: 1/128
4. Chart Drive: 2 mm/min
5. Gases: UHP Helium - for pyrolysis, purge and carrier
   Zero Air - for oxidation in TOC oven and for the F.I.D. detector
   UHP Hydrogen - for F.I.D. detector

7.5. X-Ray Fluorescence Analysis

Shale samples were sent to X-ray Assay Laboratories Ltd., in Ontario, for whole rock X-ray fluorescence analysis including analysis of ten major oxides and seven minor elements.

Major element data was calculated from the oxides using chemical conversion factors. Calcium and magnesium carbonate was determined on the three control samples by dissolving the oil shale in nitric acid for one half hour, then 1ml of hydrochloric acid was added, and the digestion continued for another two hours. The samples were made up to volume with lithium buffer and Ca and Mg was determined on a simultaneous direct current plasma emission spectrometer. This value was then converted to corresponding carbonate values using conversion factors. Results can be found in Table 5.

Acid extractible calcium was approximately 5% by weight, representing greater than 92% of the total calcium as determined by XRF analysis. Acid extractible magnesium was approximately 1.5% by weight, generally representing 80% of the total magnesium. Calcium and magnesium carbonate for the remaining samples were calculated by converting total calcium and magnesium to corresponding carbonates. Although these values were slightly higher than acid extractible carbonate values, a direct comparison is beyond the scope of this report.

Sulphur trioxide was calculated from the total sulphur of the oil shale as determined by the Leco sulphur analyser. Oxides determined by XRAL were on ashed samples; therefore, true SO_3 values may be lower than calculated. Results can be found in Appendix I.

TABLE 5. Comparison of total Ca and Mg verses acid extractable Ca and Mg for the Control samples.

	Control #1		Control #2		Control #3	
	total	acid ex.	total	acid ex.	total	acid ex.
Ca	5.26	4.82	5.81	5.61	5.51	5.02
CaO	7.36	6.74	8.13	7.85	7.71	7.02
CaCO3	13.13	12.04	14.51	14.01	13.76	12.53
Mg	1.63	1.27	1.92	1.57	1.59	1.21
MgO	2.71	2.11	3.19	2.60	2.63	2.01
MgCO3	5.67	4.41	6.67	5.45	5.50	4.20

8.0 RESULTS AND DISCUSSION

8.1 Analytical Programme

1. Control Samples

Three subsamples were split from the bulk oil shale sample and analyzed to provide control data for comparison with beneficiation results. Control samples, analytical results and calculated mean values are tabulated in Appendix I A.

Rock-eval data for the control samples were plotted on a Hydrogen - Index T_{max} diagram (Figure 1, Appendix I A.) which suggests that the oil shale contains immature Type I kerogen. A typical van Krevelen diagram could not be plotted from the data due to the influence of carbonate minerals. It would be necessary to digest the samples with acid prior to elemental analysis in order to make use of such a plot.

8.2 Sieve Analysis

A sieve analysis was completed on the bulk sample to determine size distribution (Figure 1, Appendix I B.) and the potential for separation based on sizing the oil shale. Figure 1 is skewed to the left with approximately 90% of the bulk sample contained in the -2" to +4 mesh size fractions. Analytical results were plotted by sieve fraction to illustrate trends in data (Figures 2, 3 and 4, Appendix I B). There was a general decrease in total carbon, organic carbon, hydrocarbons (S_1, present hydrocarbons + S_2, potential hydrocarbons) and calorific value as the size of the fraction decreased, with a slight decrease in all parameters at the -1" to +1/2" fraction. This fraction also exhibited higher calcium and magnesium values than the trend would suggest. Oxygen values (measured directly by Carlo Erba Elemental Analyzer) and volatile matter also exhibited a general decrease in value as sieve size decreased - possibly reflecting a decrease in carbonate content or an increase in silicates and clays. Silica dioxide and aluminum trioxide exhibited an overall increase as grain size decreased, also suggesting an increase in clays and possibly feldspar minerals. Zirconium and barium tended to increase as grain size decreased suggesting these elements reside in the Si-Al rich fraction.

Calcium and magnesium carbonate were significantly higher in the +2" fraction and values dropped considerably with the -2" to +1" fraction, with a gradual decrease as the mesh size decreased. The carbonate values were calculated from elemental calcium and magnesium as determined by x-ray fluoresence. Thus, these values are slightly higher than carbonate calcium and magnesium actually present in the sample, due to the presence of feldspars and other calcium and magnesium bearing minerals.

Cumulative tables (Tables 8A, 8B, 8C, Appendix I.B.) were compiled to determine if these size separations concentrated an organic-rich and/or a carbonate-rich fraction. Weighted averages were calculated for a clean fraction versus a reject fraction for parameters of interest. Although calorific value, T.O.C., S_1 and S_2 were slightly higher in the +1" cumulative fraction (approximately 40% of the bulk sample) this is not a significant concentration when compared to the control sample.

Organic recoveries were calculated using the total organic carbon content and the calorific value of each fraction using the following formula:

$$\text{organic recovery} = \frac{(\text{organic content} \times \text{weight } \%)}{\text{organic content in bulk sample}}$$

Carbonate recoveries were also calculated using $CaCO_3$ and $MgCO_3$ weight percents in the same manner. Results are tabulated in Table 9, Appendix I B. These calculations also suggest that there is a slight increase in organic recoveries in the +1" fraction.

Calcium carbonate and magnesium carbonate doubled in concentration in the +2" fraction but this contained only 2.50% by weight of the bulk sample with a recovery of 5.72% and 4.90% respectively, thus concentration of this fraction would not be practical.

Brown and Abbott (1981) also completed a sieve analysis on the New Brunswick Oil Shale. They used different sieve sizes and a much smaller bulk sample and determined the degree of separation using Fischer Assay. Oil content of the size fractions ranged from 4.8 gal/ton to 6.4 gal/ton with cumulative percentages of 5.3 to 5.6 gal/ton. They also concluded that sizing did not lead to a concentration of kerogen.

8.3 Float-Sink Analysis

Float-sink analysis was completed on eight sieve fractions ranging in size from +2" to +400 mesh. Table 1 and Figure 1, Appendix I C. represent weight recoveries recalculated for the bulk sample. A normal distribution of float-sink fractions was observed with approximately 90% of the sample within the 2.00 float to 2.40 float fractions. Low recoveries in the lightest and heaviest fractions should be taken into consideration when examining trends in data. Analytical data is plotted in Figures 2 to 33, Appendix I C. to illustrate these trends.

Generally parameters representing organic matter content such as organic carbon, calorific value, and hydrocarbon content (S_1 + S_2) exhibited a significant decrease from 1.60 float to 2.60 sink in all size fractions except the -2" to +1" sample. Here the data consistently exhibited a normal distribution with organic matter concentrated in the middle fractions and decreasing at both ends.

Inorganic carbon (total carbon - organic carbon) tended to be greater in the heavier float-sink fractions and this generally followed increases in calcium and magnesium content, supporting an enrichment of carbonates in the heavier fractions. Total carbon and volatile matter were directly proportional in the lighter float-sink fractions while volatile matter followed oxygen content in the heavier fractions. This also suggests that there is a greater amount of carbonates present in the heavier fractions which are lost during the volatilization of the sample at 950°C. Mineralogy data from the automated scanning electron microscopy analysis also confirmed this enrichment of carbonate in the heavy fractions. Plots were created of weight percent calcite, dolomite and ankerite (ankerite + andradite overlap) and can be found in Figures 18 to 21, Appendix I.C.

The occurrence of pyrite may be illustrated by the plots of Fe_2O_3 and SO_3 (Figures 30 to 33, Appendix I C). These oxides tend to be directly proportional but do not follow similar trends from one size fraction to the next. One would expect to see a concentration of pyrite in the heavier fractions but this is not always the case. This may be related to the sieve size and the size at which pyrite is liberated from the clay matrix. The finer sieve sizes (-48 mesh) exhibited a large concentration of pyrite in the 2.60 sink fraction. This was also evident from examination of S.E.M. mineralogy data.

Ash content correlated directly with SiO_2 and Al_2O_3 content and these parameters generally decreased as the specific gravity fraction increased. This trend tended to be inversely proportional to the carbonate content of the sample reflected in volatile matter, oxygen and calcium oxide. Plagioclase, quartz and clays were plotted from the S.E.M. automated analysis to illustrate trends in silicate mineralogy (Figures 26 to 29, Appendix I C). All three minerals exhibit a substantial decrease in the heavier fractions, supporting this trend.

Although these trends appear to be significant, recoveries of the fractions enriched in either organics or carbonates tend to be very low. For this reason, tables were compiled of data for the parameters of interest (Tables 8 to 15, Appendix I C.) to illustrate cumulative float and sink data with cumulative yields. Close examination of these tables is necessary to determine the most favourable sieve fraction and specific gravity to obtain the desirable yields with acceptable organic and carbonate content enrichment. The cumulative float data for each sieve size generally agreed with the analysis of the bulk sieve fraction with the exception of the +2" fraction. Here, error was introduced because the size of the sample necessary to obtain a representative split was not practical for the facilities available. Thus, the +2" data is not considered to be an accurate reflection of this size fraction.

Organic recoveries were calculated using the total organic carbon and calorific value of each float-sink fraction. Carbonate recoveries were calculated using the $CaCO_3$ and $MgCO_3$ weight percent. and values are tabulated in Table 16, Appendix I C. Organic upgrading tended to be highest in the 2.20 float and lighter fractions, while carbonate upgrading tended to be highest in the 2.40 float to 2.60 float and heavier fractions.

8.4. Concentrating Table Tests

Concentrating table tests resulted in a distinct separation of concentrate and tails fractions in both organic and carbonate content. Analytical data is plotted and tabulated in Appendix I D. Increasing the transverse tilt and/or the water flow rate resulted in an increase in concentrate recoveries with a decrease in organic matter. On the other hand. an increase in the stroke length resulted in a decrease in concentrate recoveries with an increase in organic matter. Plots of each sample (numbered 1 to 10) against total organic carbon, calorific value and calcium carbonate content are found in Figures 1, 2 and 3. Appendix I.D.

Organic and carbonate recoveries were calculated for the concentrate and tails fractions respectively and can be found in Table 8, Appendix I.D. There was little or no upgrading in organic carbon in test numbers 1, 2, 4 and 10, while test numbers 5, 6, and 7 exhibited an upgrading in organic recoveries from the bulk sample of 5 to 6%. This was calculated by subtracting the weight percent recovery from the T.O.C. recovery. Calcium carbonate recoveries ranged from 26% to 99% with a maximum upgrading in recoveries from the bulk sample of approximately 15% (Test number 8). Test numbers 7 and 8 contained the highest magnesium carbonate upgrading with approximately 11% and 10% increase in recoveries from the bulk sample.

This increase in carbonate content in the tails fraction was also observed from examination of the scanning electron microscopy mineralogy data (Appendix I J). There were substantial increases in such minerals as calcite, dolomite, ankerite (and andradite overlap) in most tails fractions.

Test number 7 exhibited the best overall separation with a concentrate recovery of 60.59%, T.O.C. of 10.47% and calorific value of 2174 Btu/lb. This represents an organic upgrading of 9.8% and 8.27% respectively. This run had a tails recovery of 39.41%, with 18.56% $CaCO_3$ and 8.03% $MgCO_3$, representing an upgrading in recoveries of 13.61% and 11.17% respectively. It may be possible to improve this separation by lowering the transverse tilt angle and decreasing the flow rate.

8.5. Jigging Test

Jigging tests concentrated a carbonate enriched fraction in the refuse to some degree with little or no enrichment of organic matter in the clean fraction. Analytical results are tabulated and plotted in Appendix I E.

Organic recoveries using total organic carbon and calorific values of the concentrate fraction as well as carbonate recoveries, using $CaCO_3$ and $MgCO_3$ in the tails fraction were calculated (Table 8, Appendix I E). There was little or no upgrading of T.O.C's in the concentrate fraction with T.O.C. recoveries relatively close to concentrate recoveries. Calcium and magnesium carbonate do show a slight upgrading in some runs with test #20 exhibiting the best results. Here the tails fraction represented 45.13% of the sample with a $CaCO_3$ recovery of 54.23% and a $MgCO_3$ recovery of 53.64%. This represents an upgrading in recoveries of 9.10% and 8.51% respectively. Jigging was, therefore, much less successful than Tabling at concentrating an organic fraction, and slightly less successful at concentrating a carbonate-rich fraction.

8.6. Froth Flotation

Froth flotation techniques were successful in concentrating a relatively small organic-rich fraction with little or no upgrading of the carbonate content in the tails fraction. Analytical results are tabulated and plotted in Appendix I F.

Relatively high total organic carbon values, up to 14.51%. were obtained from some concentrates; however, recoveries of these concentrates were very low. Organic recoveries were calculated using total organic carbon and calorific value results and can be found in Table 11 to 14, Appendix I F. The greatest concentrate upgrading occurred in test numbers 6 and 8 (-50 mesh) and test number 5 (-200 mesh). Additional testing is necessary to outline optimal flotation parameters due to the numerous variables and limited number of tests completed.

Carbonate recoveries were calculated for the tails fractions using $CaCO_3$ and $MgCO_3$ contents (Tables 11 to 14, Appendix I F.). There appears to be little, if any, upgrading of the tails fractions in carbonate content. This may be due to the tendency for finer carbonate minerals to float with the kerogen fraction, suggesting an intimate relationship.

Ten concentrates were refloated in an attempt to improve the organic recoveries with limited success. Organic recoveries were calculated based on the original flotation concentrate (Table 13, Appendix I F.) and then recalculated to the weight percent of the original sample (Table 14, Appendix I F.). Test numbers 7, 10 (-50 mesh), and 3 (-200 mesh) actually resulted in lower total organic carbon values than the original concentrate (Table 13). Other runs exhibited slight increases in organic carbon (up to 6%) with decreases in organic recoveries.

It appears from the tests conducted that grinding to -200 mesh (-75 um) did not liberate the kerogen fraction to any extent. Krishanan et al. (1983), estimated in their flotation studies that the particle size should be less than 10 to 20 microns in order to liberate inorganic shale minerals. Additional grinding may improve organic recoveries; but the problem may also be related to the tendency of fine carbonate minerals to float and dilute the organic yield of the concentrate.

8.7. Magnetic Separation

Magnetic separation was conducted in attempts to concentrate an organic and/or carbonate fraction without success. Two runs were completed with less than 0.1% magnetic recoveries and the method was abandoned. Analytical results are tabulated in Appendix I G.

Datta and Salotti (1982) also attempted magnetic separation of eastern United States oil shales with little success. They obtained slightly higher recoveries but recognized no separation of the organic-rich particles or rejection of the organic-lean particles. This method may work better for an oil shale with a high magnetic fraction.

8.8. Air Classification

Triplicate tests were conducted using the air classification technique with inconsistant sizing results. Analytical test results are tabulated and plotted in Appendix I H.

Average particle sizes for test number 3 were finer than for test numbers 1 and 2. This may be related to variations in the original sample although all three samples were pulverized to -200 mesh. The bulk of each test was greater than 5 um and less than 30 um in average size.

Organic and carbonate recoveries were calculated for samples with available data and can be found in Table 6, Appendix I H. For sizes M=8 fine and M=8 coarse, there was a slight depletion of organic matter with reference to the control sample, with the 8 fine containing the minimum organics.

The finest size fraction (M=0, 2 to 3 um) may contain more clay minerals than the other fractions, although no chemical data is available to support this. As the fractions coarsen, carbonate minerals become more dominant, probably due to their larger grain size in the original sample and greater hardness.

8.9. Oil Agglomeration

Little or no kerogen agglomerates formed in oil agglomeration tests conducted on -200 mesh bulk samples and flotation concentrates. The addition of hydrochloric acid, sulphuric acid and Darvan dispersant was not successful in improving recoveries. Control parameters and analytical results for oil agglomeration tests are tabulated in Appendix I I. Although there were insufficient recoveries to analyse the chemistry of the concentrate fraction, the tails fraction appeared to be depleted in calcium and magnesium when compared to the control sample (Table 4, Appendix I I.). This suggests that the carbonates were actually concentrated in the agglomerate fraction. The presence of abundant carbonate minerals, therefore, tended to interfere with tests that concentrated the organic fraction.

8.10. MINERALOGY - S.E.M. - E.D.X. - P.R.C.

8.10.(1) Manual Survey - S.E.M.

The mineral suite of the Albert oil shale was identified by manual examination of -60 mesh polished pellets of three control samples using a scanning electron microscope equipped with an x-ray microanalyzer. Observations were made in the backscatter mode, thus brightness levels in the photomicrographs reflected differences in atomic numbers of the minerals. Distinct, often rounded to subrounded grains of such minerals as quartz, feldspar (may also be anaclime), calcite, and ankerite were commonly observed. Less common grains included dolomite, gypsum and rutile. Pyrite and siderite were also present generally as finely disseminated crystals. Arsenic was detected in one of the pyrite crystals x-rayed. Clays such as illite occurred as fine whisps and also mixed with carbonates to form a matrix for larger grains.

In order to examine the mineral/kerogen association, a polished pellet was examined from control sample number 3, -20 mesh material (Plate 1, Photo 1 to 4, Appendix I J.). Here, actual spores and algal material were observed as black bodies due to the low atomic number of organic matter. Two grain types were observed: one with predominantly mineral matter with a few scattered kerogen bodies (Photos 1. and 4); the second less common type, with mineral grains embedded in an organic matrix (Photo 3). This reflects the varved nature of the oil shales.

8.10.(2) Automated Survey - S.E.M.

An automated survey using the scanning electron microscope and proprietary P.R.C. (Particle Recognition and Characterization) program provided mineralogical data that generally reflected available chemical trends and inferred the sites of recorded elements. Analytical results are summerized in Appendix I K. for one hundred and sixteen samples.

Standards were analysed to identify overlapping mineral identifications and are outlined in Table 1, Appendix I K. Overlaps that should be noted in particular when examining the oil shale analyses are:
- plagioclase, anaclime, zeolite
- hornblende, andradite, epidote
- andradite, ankerite

The most obvious mineralogical trends were observed in the float-sink samples. Pyrite, calcite, dolomite and ankerite were concentrated in the heavier float-sink fractions while quartz, plagioclase and clays were depleted. These trends are generally supported by the chemical analysis (Table 5, Appendix I C).

9.0. SUMMARY AND RECOMMENDATIONS

1. The bulk Albert oil shale sample contained immature Type I kerogen and was characterized by the following:

ash = 78.02%
sulphur = 0.68%
$CaCO_3$ = 13.80%
$MgCO_3$ = 5.95%

calorific value = 1913 Btu/lb
total organic carbon = 9.01%
$S_1 + S_2$ (hydrocarbons) = 79.04 kg/tonne
Tmax = 441°C

2. Sizing the oil shale by sieving did not result in significant concentration of organics or carbonate content although negative trends of both occurred with a decrease in grain size. This suggests that clay and silicate minerals predominate in the finer fractions.

3. Significant decreases in organic matter and increases in carbonate content occurred as the float-sink gravity increased. These trends were moderated, however, when weight recoveries were considered; but do suggest a slight upgrading of organics is possible using gravity separations. Organic upgrading tended to be highest in the 2.20 float and lighter fractions while carbonate upgrading tended to be highest in the 2.40 to 2.60 float and heavier fractions.

4. Concentrating table testing was the most successful technique to concentrate a carbonate-rich tails fraction, upgrading the recovery by approximately 15% and representing an increase in $CaCO_3$ of almost 60% over the control sample.

5. Jigging tests were less successful with little or no increase in organic recoveries and slight increases in carbonate recoveries.

6. Froth flotation tests concentrated an organic fraction with low recoveries. Grinding the sample to a finer grain size to liberate the kerogen from the mineral matter, as suggested in the literature did not improve concentrations. This could be due to the interference of fine carbonate minerals which tended to float and dilute the concentrate.

7. Oil agglomeration tests were not successful on this shale possibly due to the carbonate content. The tails fractions tended to be depleted in carbonates when compared to the control sample suggesting that the oil was selective for the carbonates.

8. Magnetic separation did not separate the Albert oil shale due to the low magnetic fraction present and air classification was studied in its place. Fine grain sizes (<10 um) tended to be enriched slightly in organic matter, but recoveries were very low. As grain size increased, carbonate content increased but this was not significant.

9. Scanning electron microscopic examination revealed that the shale consists of a more abundant mineral-rich fraction and a less abundant organic-rich fraction, reflecting the varved nature of these shales. Distinct spores and kerogen bodies were observed embedded in mineral matter. Organic matter was also observed as a matrix for other minerals.

10. Rounded to subrounded grains of such minerals as quartz, feldspar (may also be analcime) calcite and ankerite were commonly observed. Less common grains included dolomite, gypsum and rutile. Pyrite (sometimes with traces of arsenic) and siderite were present generally as finely disseminated crystals in a mineral matrix. Clays such as illite occurred as fine whisps and mixed with carbonates to form a mineral matrix.

11. A proprietary P.R.C. (Particle Recognition and Characterization) program was able to outline mineral assemblages in general agreement with available chemical data.

9.2. RECOMMENDATIONS

Only slight upgrading of organic content was possible with the tests completed on the Albert oil shale. This shale is enriched in carbonate minerals which seem to interfere with organic concentration processes, especially flotation and agglomeration. One possible route to improve concentration grades would be to optimize concentrating table parameters and obtain a tails fraction enriched in carbonate minerals. Then attempt flotation using the carbonate depleted concentrate fraction.

The same idea may also be applied to the float-sink fractions. Organic recoveries tended to be highest with the 2.20 float and lighter fractions while carbonates tended to be higher in the heavier fractions. The cumulative 2.20 float may respond well to froth flotation.

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APPENDIX I

ANALYTICAL DATA

A. Control Samples

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TABLE 1 PROXIMATE ANALYSIS - CONTROL SAMPLE

SAMPLE I.D.	MOISTURE (%)	VOLATILES (%)	(%) ASH	(%) FIXED CARBON
		I———	dry basis	———I
CONTROL #1	0.94	21.93	78.07	0.00
CONTROL #2	1.10	22.56	77.43	0.00
CONTROL #3	1.25	21.44	78.56	0.00
MEAN	1.10	21.98	78.02	0.00

AIR DRIED MOISTURE = 10.29% (BASED ON NINE SPLITS FROM THE BULK SAMPLE)

TABLE 2. CONTROL SAMPLE - ULTIMATE ANALYSIS

SAMPLE I.D.	CARBON (wt %)	HYDROGEN (wt %)	NITROGEN (wt %)	OXYGEN (wt %)	SULFUR (wt %)	CALORIFIC * VALUE(BTU/lb)
CONTROL #1	12.37	1.51	0.72	7.76	0.68	1985
CONTROL #2	12.02	1.42	0.74	8.59	0.66	1890
CONTROL #3	11.87	1.48	0.66	7.68	0.71	1863
MEAN	12.09	1.47	0.71	8.01	0.68	1913

* CALORIFIC VALUE IS CORRECTED FOR SULFUR

TABLE 3: ROCK EVAL ANALYSIS - CONTROL SAMPLES

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
CONTROL 1	0.06	8.37	73.98	442	9.29	0.10	796
CONTROL 2	0.06	7.63	68.81	441	8.66	0.10	795
CONTROL 3	0.00	7.65	70.69	441	9.07	0.10	779
MEAN	0.04	7.88	71.16	441	9.01	0.10	790

ACI STD.	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	TOC (WT %)
OIL SHALE STD. CERTIFIED :	0.00	1.37	15.02	442	4.62
OIL SHALE STD. CHECKS :	0.00	1.23	14.94	442	4.41
	0.00	1.35	15.57	442	4.62
BLANKS:	0.00	0.00	0.01	444	0.00
	0.00	0.00	0.00	445	0.00

CONTROL SAMPLES

TABLE 4 XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES

Sample I.D.	SiO2 wt.%	Al2O3 wt.%	TiO2 wt.%	Fe2O3 wt.%	MnO wt.%	MgO wt.%	CaO wt.%	Na2O wt.%	K2O wt.%	P2O5 wt.%	SO3@ wt.%	LOI wt.%	TOTAL MAJORS
CONTROL 1	45.4	12.6	0.61	5.10	0.10	2.71	7.36	1.24	2.22	0.52	1.70	21.9	101.5
CONTROL 2	43.3	12.1	0.59	5.19	0.10	3.19	8.13	1.15	2.13	0.48	1.65	22.5	100.5
CONTROL 3	45.0	12.6	0.61	5.10	0.10	2.63	7.71	1.17	2.21	0.49	1.77	21.5	100.9
MEAN	44.6	12.4	0.60	5.13	0.10	2.84	7.73	1.19	2.19	0.50	1.71	22.0	101.0

@ SO3 IS CALCULATED FROM LECO TOTAL SULFUR ANALYSIS

TABLE 5 XRF WHOLE ROCK ANALYSIS - MAJOR ELEMENTS AND CARBONATES CALCULATED

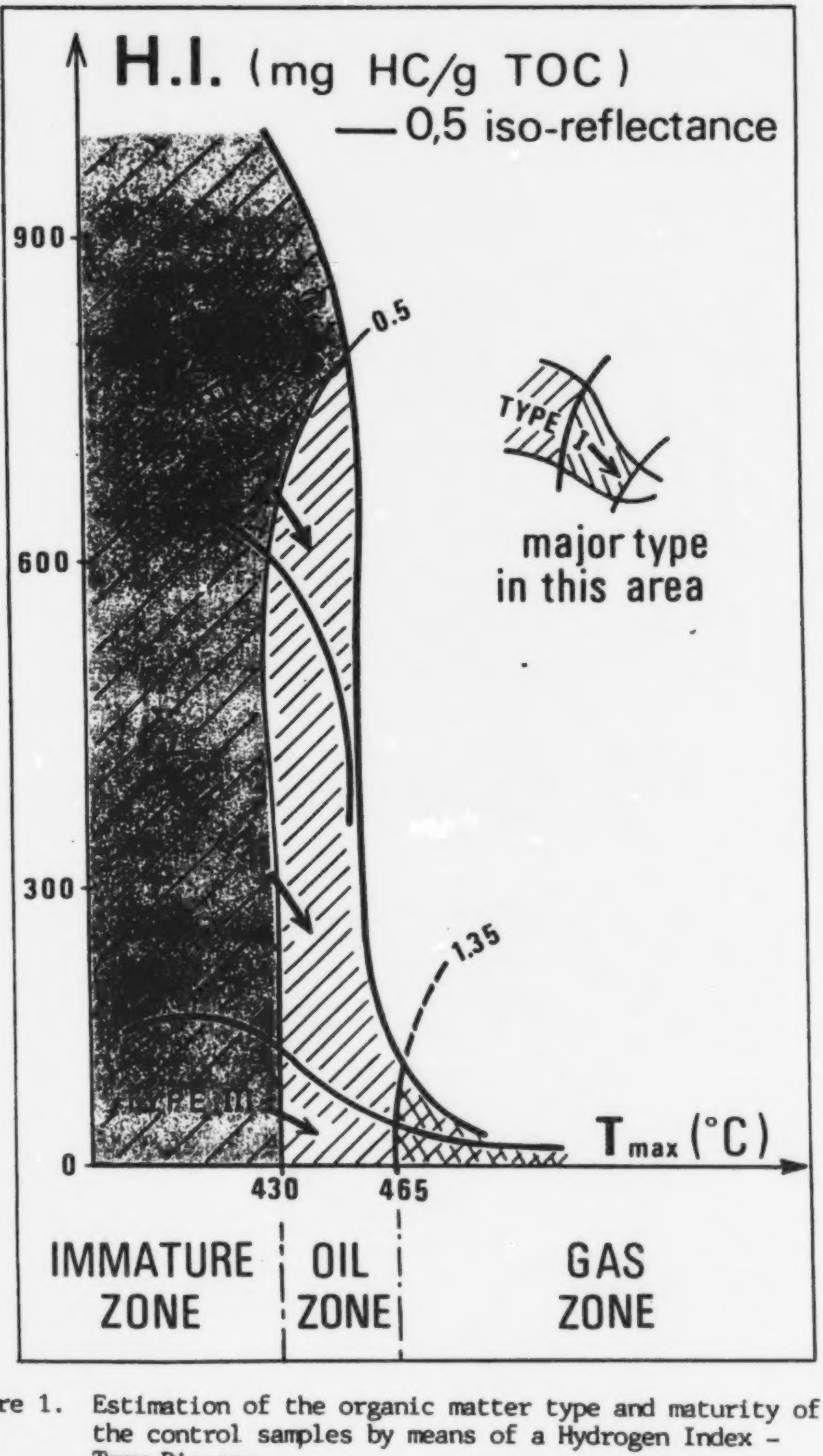
Sample I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S' wt.%	CaCO3 wt.%	MgCO3 wt.%
CONTROL 1	21.2	6.67	0.37	3.6	0.077	1.63	5.3	0.92	1.8	0.23	0.68	13.13	5.67
CONTROL 2	20.2	6.41	0.35	3.6	0.077	1.92	5.8	0.85	1.8	0.21	0.66	14.51	6.67
CONTROL 3	21.0	6.67	0.37	3.6	0.077	1.59	5.5	0.87	1.8	0.21	0.71	13.76	5.50
MEAN	20.8	6.58	0.36	3.6	0.077	1.71	5.5	0.88	1.8	0.22	0.68	13.80	5.95

' sulphur is determined directly

TABLE 6 XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS

Sample I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
CONTROL 1	70	90	450	20	100	20	420
CONTROL 2	70	90	480	20	90	20	400
CONTROL 3	70	110	470	<10	90	20	400
MEAN	70	97	467	20	93	20	407

Hydrogen Index - T_{max} diagram



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APPENDIX I

ANALYTICAL DATA

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TABLE 1 : SIEVE ANALYSIS RESULTS - BULK SAMPLE

SIEVE FRACTION	FRACTION WT. (g)	WT. PERCENT
+2"	1949.00	2.50
-2"+1"	29185.00	37.38
-1"+1/2"	26892.00	34.44
-1/2"+4 mesh	13687.00	17.53
-4+10 mesh	3614.00	4.63
-10+48 mesh	1795.00	2.30
-48+200 mesh	443.00	0.57
-200+400 mesh	236.00	0.30
-400 mesh	273.00	0.35
	78074.00	100.00

TABLE 2 : PROXIMATE ANALYSIS - SIEVE FRACTIONS

SIEVE FRACTION	MOISTURE (%)	VOLATILES (%)	(%) ASH	(%) FIXED CARBON
		I——dry basis——I		
+2"	1.00	35.79	64.21	0.00
-2"+1"	1.05	22.86	77.14	0.00
-1"+1/2"	1.12	23.16	76.84	0.00
-1/2"+4 mesh	1.07	22.12	77.88	0.00
-4+10 mesh	1.32	20.78	79.22	0.00
-10+48 mesh	1.56	18.81	81.19	0.00
-48+200 mesh	2.04	17.82	82.18	0.00
-200+400 mesh	2.16	17.17	82.83	0.00
-400 mesh	1.99	16.01	83.99	0.00

TABLE 3 : ULTIMATE ANALYSIS - SIEVE FRACTIONS(AS DETERMINED)

SIEVE FRACTION	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
+ 2"	18.25	1.79	0.23	14.50	0.36	63.57	2495
-2" to + 1"	13.78	1.72	0.56	12.72	1.10	76.33	2228
-1" to +1/2"	11.21	1.33	0.47	9.95	0.75	75.98	1525
-1/2 to +4m	13.07	1.73	0.48	7.52	0.70	77.05	2143
-4m to +10m	12.36	1.67	0.46	7.72	0.60	78.17	1866
-10m to +48m	10.92	1.54	0.70	6.49	0.56	79.92	1607
-48m to +200m	8.83	1.36	0.57	6.45	1.29	80.50	1110 '
-200m to +400m	7.66	1.17	0.04	6.87	1.43	81.04	791 '
-400m	6.79	1.15	0.92	7.26	1.13	82.32	650 '

@ CORRECTED FOR SULFUR

' SPIKED (SEE PROCEDURE IN ANALYTICAL TECHNIQUES)

TABLE : 4 ROCK-EVAL ANALYSIS SIEVE FRACTIONS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
+2"	0.00	6.66	96.87	447	10.88	0.06	890
-2" to +1"	0.07	9.43	84.64	444	10.17	0.10	832
+1" to +1/2"	0.00	7.43	58.88	440	7.61	0.11	774
-1/2" to +4m	0.00	8.13	81.51	442	9.99	0.09	816
-4m to +10m	0.00	6.55	71.01	441	9.13	0.08	778
-10m to +48m	0.00	5.09	64.23	439	8.40	0.07	765
-48m to +200m	0.00	3.62	49.12	438	6.81	0.07	721
-200m to +400m	0.00	2.72	41.86	436	6.06	0.06	691
-400m	0.00	2.55	35.03	431	5.59	0.07	627

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - SIEVE FRACTIONS

SAMPLE I.D.	SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	SO_3@ wt%	LOI wt%	TOTAL MAJORS
+2"	27.0	5.98	0.30	4.72	0.17	5.57	17.7	0.54	0.92	0.33	0.90	35.0	99.1
-2" +1"	43.8	11.5	0.56	4.99	0.09	2.38	7.77	1.43	2.03	0.71	2.75	22.8	100.8
-1" +1/2"	40.8	11.8	0.58	5.15	0.10	3.38	10.4	1.14	2.04	0.57	1.87	23.0	100.8
-1/2" +4m	45.0	12.3	0.61	4.95	0.09	2.28	7.03	1.34	2.09	0.52	1.75	22.2	100.2
-4m +10m	46.1	12.9	0.63	4.98	0.09	2.35	6.69	1.17	2.11	0.51	1.50	21.2	100.2
-10m +48m	47.9	13.7	0.66	4.72	0.11	2.15	5.42	1.21	2.36	0.51	1.40	20.1	100.2
-48m +200m	48.1	13.1	0.64	5.14	0.17	1.84	6.35	0.98	2.25	0.53	3.22	19.8	102.1
-200 +400m	49.4	12.5	0.62	5.20	0.20	1.73	6.62	1.03	2.11	0.45	3.57	18.2	101.6
-400m	49.9	13.2	0.71	5.59	0.21	1.81	5.65	1.16	2.21	0.43	2.82	17.4	101.1

@ CALCULATED FROM LECO TOTAL SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - MAJOR ELEMENTS AND CARBONATES CALCULATED - SIEVE FRACTIONS

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	$CaCO_3$ wt.%	$MgCO_3$ wt.%
+2"	12.6	3.17	0.18	3.3	0.132	3.36	12.7	0.40	0.8	0.14	0.36	31.59	11.65
-2" +1"	20.5	6.09	0.34	3.5	0.070	1.44	5.6	1.06	1.7	0.31	1.10	13.87	4.98
-1" +1/2"	19.1	6.25	0.35	3.6	0.077	2.04	7.4	0.85	1.7	0.25	0.75	18.56	7.07
-1/2" +4m	21.0	6.51	0.37	3.5	0.070	1.38	5.0	0.99	1.7	0.05	0.70	12.55	4.77
-4m +10m	21.6	6.83	0.38	3.5	0.070	1.42	4.8	0.87	1.8	0.22	0.60	11.94	4.92
-10m +48m	22.4	7.25	0.40	3.3	0.085	1.30	3.9	0.90	2.0	0.22	0.56	9.67	4.50
-48m +200m	22.5	6.93	0.38	3.6	0.132	1.11	4.5	0.73	1.9	0.23	1.29	11.33	3.85
-200 +400m	23.1	6.62	0.37	3.6	0.155	1.04	4.7	0.76	1.8	0.20	1.43	11.82	3.62
-400m	23.3	6.99	0.43	3.9	0.163	1.09	4.0	0.86	1.8	0.19	1.13	10.08	3.79

@ LECO WEIGHT PERCENT SULPHUR

TABLE 7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - SIEVE FRACTIONS

	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
+2"	40	50	540	<10	50	10	160
-2" +1"	60	80	480	20	80	20	320
-1" +1/2"	60	90	560	20	70	20	400
-1/2" +4m	80	90	420	20	90	10	400
-4m +10m	70	100	400	20	90	20	360
-10m +48m	70	110	370	20	80	30	410
-48m +200m	70	100	370	40	100	20	530
-200m +400m	60	90	380	20	120	<10	470
-400m	70	110	400	20	160	10	610

TABLE 8A : CUMULATIVE DATA - SIEVE FRACTIONS

	ELEMENTARY DATA				CUMULATIVE DATA							
					CLEAN FRACTION				REJECT FRACTION			
RELATIVE SIEVE FRACTION	MASS (wt.%)	ASH (wt.%)	SULPHUR (wt.%)	CALORIFIC* VALUE(Btu/lb)	MASS (wt.%)	ASH (wt.%)	SULPHUR (wt.%)	CALORIFIC* VALUE(Btu/lb	MASS (wt.%)	ASH (wt.%)	SULPHUR (wt.%)	CALORIFIC* VALUE(Btu/lb)
+2"	2.50	63.57	0.36	2495	2.50	63.57	0.36	2495	100.00	76.24	0.86	1930
-2" +1"	37.38	76.33	1.10	2228	39.88	75.53	1.05	2245	97.50	76.57	0.87	1916
-1" +1/2"	34.44	75.98	0.75	1525	74.32	75.74	0.91	1911	60.12	76.72	0.73	1722
-1/2" +4m	17.53	77.05	0.70	2143	91.85	75.99	0.87	1955	25.68	77.70	0.70	1986
-4m +10m	4.63	78.17	0.60	1866	96.48	76.09	0.86	1951	8.15	79.11	0.69	1649
-10m +48m	2.30	79.92	0.56	1607	98.78	76.18	0.85	1943	3.52	80.35	0.81	1363
-48m +200m	0.57	80.50	1.29	1110	99.35	76.21	0.85	1938	1.22	81.15	1.28	902
-200m +400m	0.30	81.04	1.43	791	99.65	76.22	0.86	1935	0.65	81.73	1.27	719
-400m	0.35	82.32	1.13	658	100.00	76.24	0.86	1930	0.35	82.32	1.13	658
CONTROL (mean)		78.02	0.68	1913								

TABLE 8B : CUMULATIVE DATA - SIEVE FRACTIONS

	ELEMENTARY DATA				CUMULATIVE DATA							
					CLEAN FRACTION				REJECT FRACTION			
RELATIVE SIEVE FRACTION	MASS (wt.%)	S1 (mg/g)	S2 (mg/g)	T.O.C. (wt.%)	MASS (wt.%)	S1 (mg/g)	S2 (mg/g)	T.O.C. (wt.%)	MASS (wt.%)	S1 (mg/g)	S2 (mg/g)	T.O.C. (wt.%)
+2"	2.50	6.66	96.87	10.88	2.50	6.66	96.87	10.88	100.00	8.13	73.92	9.14
-2" +1"	37.38	9.43	84.64	10.17	39.88	9.26	85.41	10.21	97.50	8.17	73.33	9.09
-1" +1/2"	34.44	7.43	58.88	7.61	74.32	8.41	73.11	9.01	60.12	7.39	66.30	8.42
-1/2" +4m	17.53	8.13	81.51	9.99	91.85	8.36	74.72	9.20	25.68	7.33	76.25	9.52
-4m +10m	4.63	6.55	71.01	9.13	96.48	8.27	74.54	9.19	8.15	5.62	64.95	8.50
-10m +48m	2.30	5.09	64.23	8.40	98.78	8.20	74.30	9.17	3.52	4.40	56.97	7.66
-48m +200m	0.57	3.62	49.12	6.81	99.35	8.17	74.15	9.16	1.22	3.09	43.29	6.28
-200m +400m	0.30	2.72	41.86	6.06	99.65	8.15	74.06	9.15	0.65	2.63	38.18	5.81
-400m	0.35	2.55	35.03	5.59	100.00	8.13	73.92	9.14	0.35	2.55	35.03	5.59
CONTROL (mean)		7.88	71.16	9.01								

* CORRECTED FOR SULFUR

TABLE 8C : CUMULATIVE DATA - SIEVE FRACTIONS

	ELEMENTARY DATA			CUMULATIVE DATA					
				CLEAN FRACTION			REJECT FRACTION		
RELATIVE SIEVE FRACTION	MASS (wt.%)	$CaCO_3$ * (wt.%)	$MgCO_3$ * (wt.%)	MASS (wt.%)	$CaCO_3$ (wt.%)	$MgCO_3$ (wt.%)	MASS (wt.%)	$CaCO_3$ (wt.%)	$MgCO_3$ (wt.%)
+2"	2.50	31.59	11.65	2.50	31.59	11.65	100.00	15.48	5.81
-2" +1"	37.38	13.87	5.00	39.88	14.98	5.41	97.50	15.06	5.66
-1" +1/2"	34.44	18.56	7.08	74.32	16.64	6.18	60.12	15.81	6.08
-1/2" +4m	17.53	12.55	4.79	91.85	15.86	5.92	25.68	12.11	4.74
-4m +10m	4.63	11.94	4.93	96.48	15.67	5.87	8.15	11.17	4.64
-10m +48m	2.30	9.67	4.51	98.78	15.53	5.84	3.52	10.17	4.25
-48m +200m	0.57	11.33	3.85	99.35	15.51	5.83	1.22	11.09	3.77
-200m +400m	0.30	11.82	3.61	99.65	15.50	5.82	0.65	10.88	3.70
-400m	0.35	10.08	3.78	100.00	15.48	5.81	0.35	10.08	3.78
CONTROL (mean)		13.80	5.95						

* CARBONATE CONTENT CALCULATED

TABLE 9 : ORGANIC AND CARBONATE RECOVERIES - SIEVE ANALYSIS

SIEVE FRACTION	WT. PERCENT	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	$CaCO_3$ RECOVERY	$MgCO_3$ RECOVERY
+2"	2.30	3.02	3.26	5.72	4.90
-2" +1"	37.38	42.19	43.54	37.56	31.28
-1" +1/2"	34.44	29.09	27.45	46.33	40.93
-1/2" +4m	17.53	19.44	19.64	15.94	14.05
-4m +10m	4.63	4.69	4.52	4.01	3.83
-10m +48m	2.30	2.14	1.93	1.61	1.74
-48m +200m	0.57	0.43	0.33	0.47	0.37
-200m +400m	0.30	0.20	0.12	0.26	0.18
-400m	0.35	0.22	0.12	0.26	0.22

Figure 1.

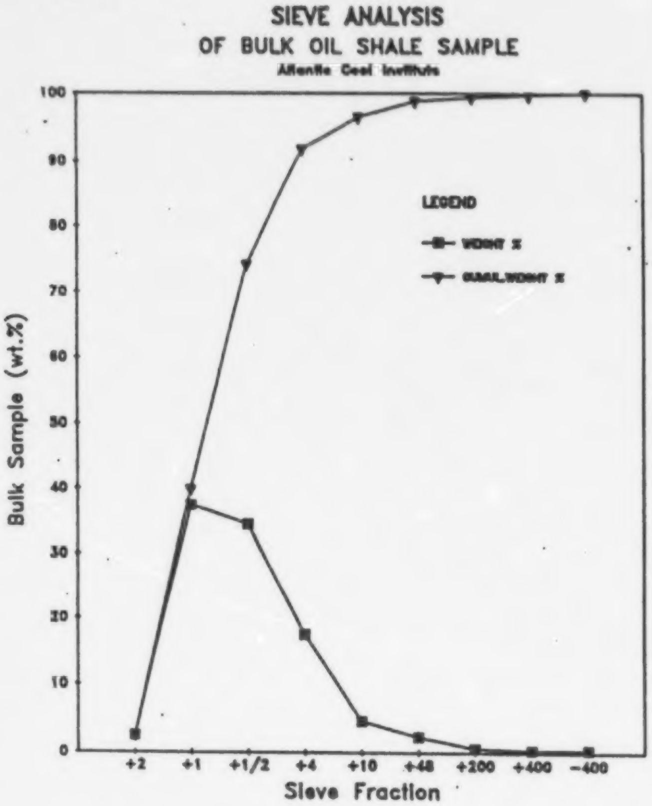


Figure 2.

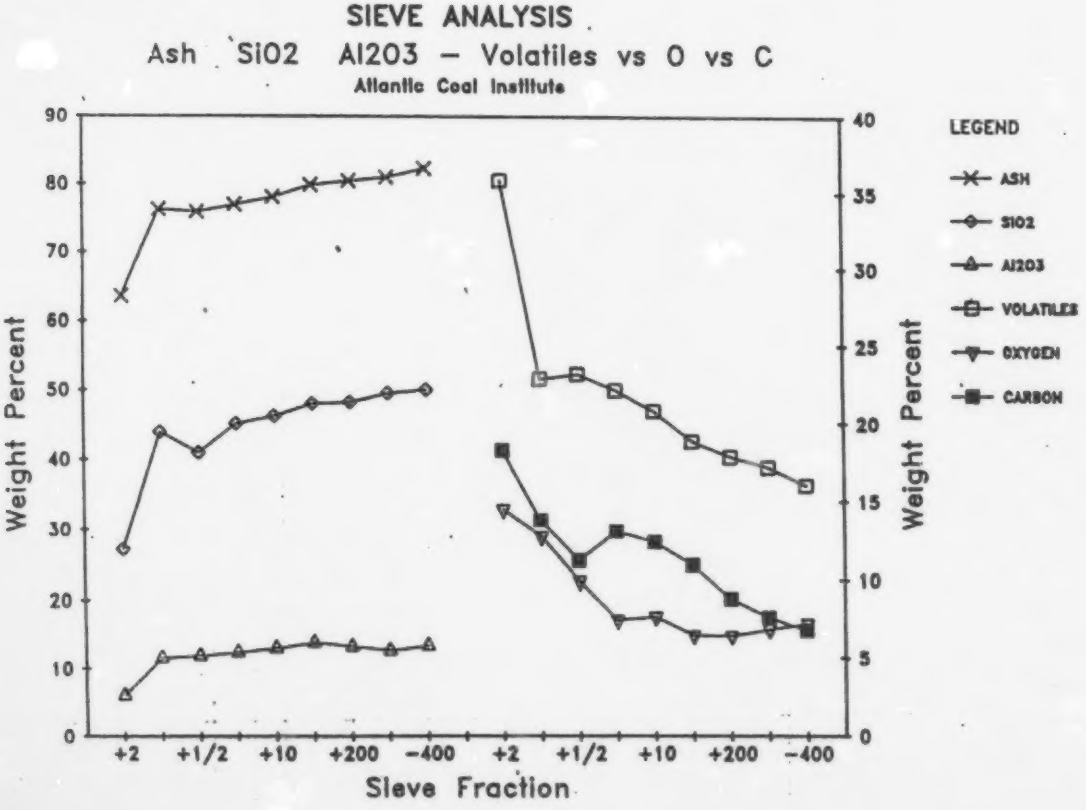


Figure 3

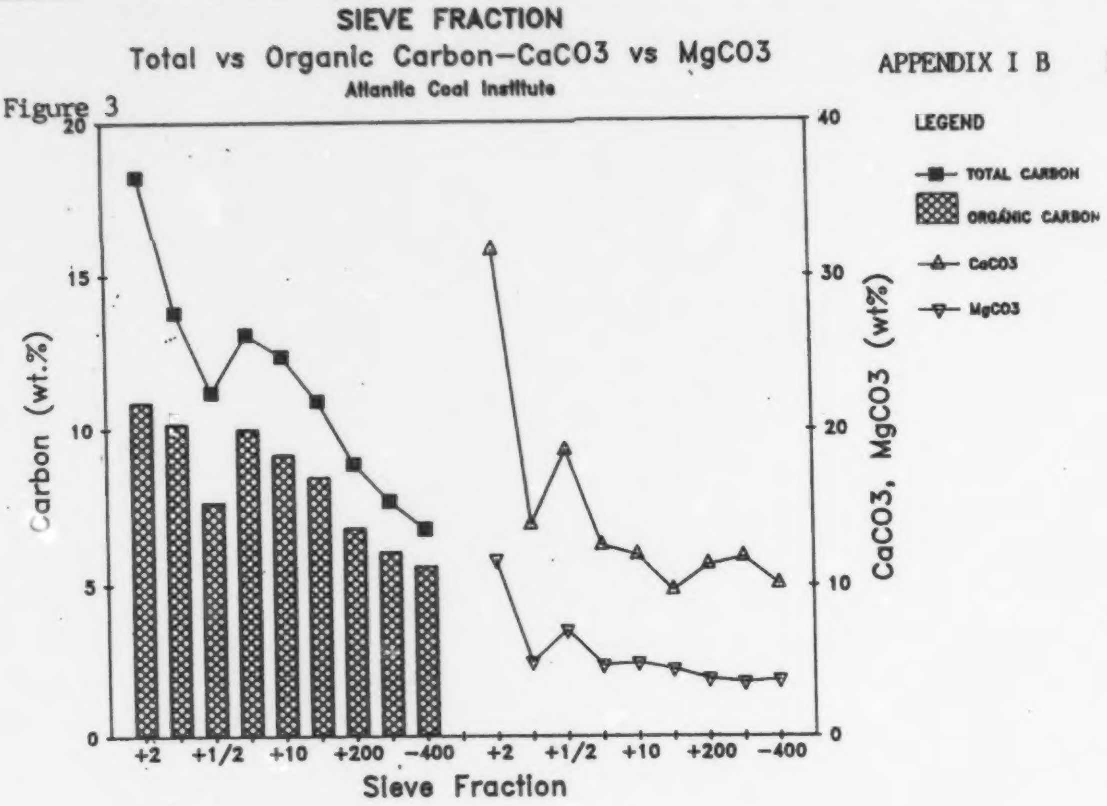
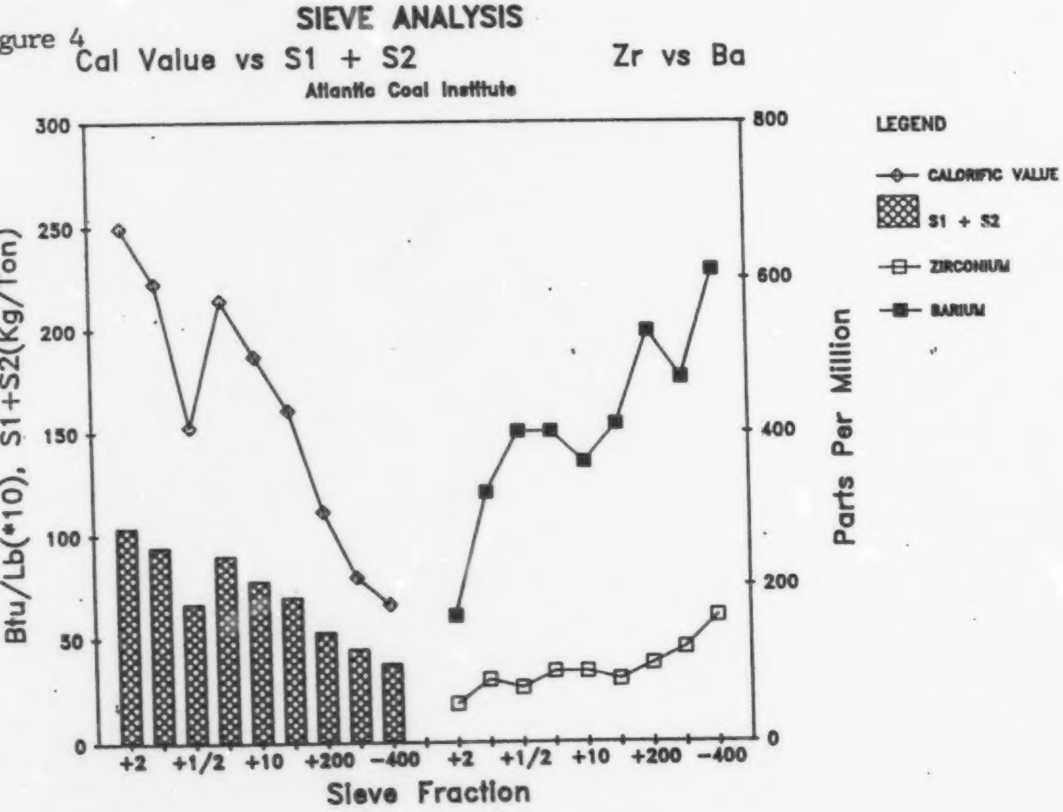


Figure 4



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ANALYTICAL DATA

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TABLE 1 : CALCULATED FLOAT-SINK WEIGHT PERCENTS FOR BULK SAMPLE

RELATIVE SPECIFIC-GRAVITY FRACTIONS	WEIGHT PERCENT	CUMULATIVE WEIGHT PERCENT
FLOAT-1.60	0.76	0.76
1.60-1.80	4.05	4.81
1.80-2.00	15.10	19.91
2.00-2.20	40.69	60.60
2.20-2.40	32.74	93.34
2.40-2.60	5.57	98.91
2.60-SINKS	1.09	100.00

TABLE 2 : PROXIMATE ANALYSIS - FLOAT-SINK FRACTIONS

SAMPLE I.D.	MOISTURE (%)	VOLATILES (%)	(%) ASH	(%) FIXED CARBON
		I——dry basis		——I
+2"				
1.60 FLOAT*				
1.80 FLOAT*				
2.00 FLOAT	1.24	28.09	71.55	0.36
2.20 FLOAT	1.24	24.27	75.73	0.00
2.40 FLOAT	0.94	18.64	81.36	0.00
2.60 FLOAT	0.79	36.47	63.45	0.08
2.60 SINK*				
-2" +1"				
1.60 FLOAT	1.67	18.19	81.81	0.00
1.80 FLOAT	2.05	23.23	76.66	0.10
2.00 FLOAT	1.74	27.89	72.11	0.00
2.20 FLOAT	1.02	23.53	76.47	0.00
2.40 FLOAT	0.84	23.00	77.00	0.00
2.60 FLOAT*				
2.60 SINK*				
-1" +1/2"				
1.60 FLOAT	1.80	30.88	68.82	0.31
1.80 FLOAT	1.98	24.17	74.87	0.96
2.00 FLOAT	1.79	21.88	77.77	0.35
2.20 FLOAT	1.09	22.78	77.22	0.00
2.40 FLOAT	0.85	19.41	80.59	0.00
2.60 FLOAT	0.46	37.29	62.71	0.00
2.60 SINK	0.82	26.84	73.16	0.00
-1/2" +4m				
1.60 FLOAT	1.25	28.44	69.70	1.87
1.80 FLOAT	1.03	25.89	73.01	1.10
2.00 FLOAT	1.03	20.85	78.90	0.25
2.20 FLOAT	0.66	21.10	78.90	0.00
2.40 FLOAT	0.43	21.39	78.61	0.00
2.60 FLOAT	0.24	31.00	69.00	0.00
2.60 SINK*				

* INSUFFICIENT SAMPLE

SAMPLE I.D.	MOISTURE (%)	VOLATILES (%)	(%) ASH	(%) FIXED CARBON
		I——dry basis		——I
-4m +10m				
1.60 FLOAT	1.44	30.85	68.17	0.98
1.80 FLOAT	1.73	22.81	76.25	0.94
2.00 FLOAT	1.90	19.77	79.38	0.86
2.20 FLOAT	2.60	18.18	81.82	0.00
2.40 FLOAT	1.37	19.65	80.35	0.00
2.60 FLOAT	0.80	27.23	72.77	0.00
2.60 SINK	0.52	26.33	73.67	0.00
-10m +48m				
1.60 FLOAT	1.74	32.28	66.93	0.79
1.80 FLOAT	1.54	30.34	69.66	0.00
2.00 FLOAT	1.32	22.45	76.06	1.49
2.20 FLOAT	5.24	17.39	82.12	0.50
2.40 FLOAT	3.58	16.68	83.32	0.00
2.60 FLOAT	1.49	19.53	80.47	0.00
2.60 SINK	0.40	24.77	75.23	0.00
-48m +200m				
1.60 FLOAT*				
1.80 FLOAT*				
2.00 FLOAT	2.24	35.73	62.84	1.43
2.20 FLOAT	1.99	23.82	74.33	1.85
2.40 FLOAT	4.89	17.94	82.00	0.06
2.60 FLOAT	2.95	14.68	85.32	0.00
2.60 SINK	0.22	14.60	85.40	0.00
-200m +400m				
1.60 FLOAT*				
1.80 FLOAT*				
2.00 FLOAT*				
2.20 FLOAT	2.91	26.57	72.15	1.27
2.40 FLOAT	2.71	17.75	82.15	0.10
2.60 FLOAT	1.53	15.68	84.32	0.00
2.60 SINK	1.24	19.56	80.44	0.00

* INSUFFICIENT SAMPLE

TABLE 3 : ULTIMATE ANALYSIS - FLOAT-SINK FRACTIONS (AS DETERMINED)

SAMPLE I.D.	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
+2"							
1.60 FLOAT	*	*	*	*	*	*	*
1.80 FLOAT	*	*	*	*	*	*	*
2.00 FLOAT	18.55	2.42	0.64	6.94	0.56	70.66	3619
2.20 FLOAT	13.57	1.55	0.50	8.67	0.91	74.79	2205
2.40 FLOAT	9.16	1.15	0.56	6.80	2.31	80.60	1667 '
2.60 FLOAT	12.25	0.38	0.02	21.96	0.00	62.95	797 '
2.60 SINK	*	*	*	*	*	*	*
-2" +1"							
1.60 FLOAT	11.94	1.75	0.05	4.49	0.00	80.44	2239
1.80 FLOAT	16.96	2.44	0.14	4.98	0.28	75.09	3241
2.00 FLOAT	17.46	2.22	0.37	7.85	1.84	70.86	3375
2.20 FLOAT	13.13	1.63	0.63	7.76	0.74	75.69	2317
2.40 FLOAT	11.14	1.25	0.55	9.20	0.66	76.35	849 '
2.60 FLOAT	*	*	*	*	*	*	*
2.60 SINK	*	*	*	*	*	*	*
-1" +1/2"							
1.60 FLOAT	22.50	3.20	0.50	5.90	0.40	67.58	4656
1.80 FLOAT	17.98	2.49	0.45	5.33	0.38	73.39	3441
2.00 FLOAT	14.41	2.02	0.34	5.86	0.45	76.38	2750
2.20 FLOAT	12.12	1.55	0.40	6.46	0.70	76.38	2168
2.40 FLOAT	9.45	1.17	0.45	6.64	1.07	79.90	1462
2.60 FLOAT	12.03	0.41	0.15	20.41	0.01	62.42	975 '
2.60 SINK	7.06	0.18	0.05	15.22	14.48	72.56	535 '
-1/2" +4m							
1.60 FLOAT	21.91	3.13	0.22	6.64	0.33	68.83	4514
1.80 FLOAT	18.41	2.58	0.32	5.84	0.43	72.26	3751
2.00 FLOAT	12.96	1.88	0.35	5.41	0.34	78.09	2516
2.20 FLOAT	11.41	1.49	0.52	6.64	0.63	78.38	1844
2.40 FLOAT	9.77	1.09	0.40	7.94	0.85	78.27	1524
2.60 FLOAT	10.34	0.46	0.05	18.01	0.61	68.83	321 '
2.60 SINK	10.91	0.34	0.08	23.67	3.24	*	122 '

* INSUFFICIENT SAMPLE

@ CORRECTED FOR SULFUR

' SPIKED (SEE PROCEDURE IN ANALYTICAL TECHNIQUES)

TABLE 3 : ULTIMATE ANALYSIS - FLOAT-SINK FRACTIONS (AS DETERMINED)

SAMPLE I.D.	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
-4m +10m							
1.60 FLOAT	25.55	3.43	0.53	6.24	0.45	67.19	5049
1.80 FLOAT	17.46	2.41	0.44	5.31	0.35	74.93	3420
2.00 FLOAT	13.66	1.90	0.41	5.69	0.35	77.87	2565
2.20 FLOAT	10.78	1.44	0.55	6.18	0.54	79.69	1691
2.40 FLOAT	9.63	1.16	0.53	7.73	0.83	79.25	831 '
2.60 FLOAT	10.43	0.67	0.25	14.72	0.46	72.19	499 '
2.60 SINK -	8.87	0.33	0.08	17.35	8.39	73.29	331 '
-10m +48m							
1.60 FLOAT	25.35	3.41	0.57	6.35	0.44	65.77	5138
1.80 FLOAT	22.29	2.97	0.56	6.23	0.51	68.59	4311
2.00 FLOAT	16.45	2.32	0.50	5.39	0.39	75.06	3171
2.20 FLOAT	10.54	1.54	0.45	4.94	0.38	77.82	1870
2.40 FLOAT	8.55	1.20	0.55	5.82	0.62	80.34	1144
2.60 FLOAT	7.54	0.83	0.44	9.16	0.63	79.27	1300 '
2.60 SINK	8.89	0.32	0.09	14.41	2.09	74.93	1041 '
-48m +200m							
1.60 FLOAT -	51.57	5.89	1.20	6.82	0.71	*	*
1.80 FLOAT -	35.96	4.65	0.89	6.00	0.78	*	*
2.00 FLOAT -	26.23	3.31	0.69	5.62	0.69	61.43	5443
2.20 FLOAT	16.26	2.23	0.50	5.16	0.43	72.85	3110
2.40 FLOAT	8.83	1.40	0.42	5.05	1.07	77.99	1098
2.60 FLOAT	5.67	0.92	0.38	5.17	0.55	82.80	493 '
2.60 SINK	6.27	0.33	0.06	12.58	4.64	85.21	233 '
-200m +400m							
1.60 FLOAT -	40.05	3.98	1.22	8.88	*	*	*
1.80 FLOAT -	38.37	4.85	0.99	6.95	*	*	*
2.00 FLOAT -	26.65	3.43	0.65	3.67	0.53	*	*
2.20 FLOAT	18.64	2.41	0.62	4.94	0.56	70.05	3418
2.40 FLOAT	7.94	1.35	0.43	5.50	1.19	79.92	1483 '
2.60 FLOAT	5.43	0.63	0.10	6.55	0.67	83.03	855 '
2.60 SINK	5.84	0.36	0.04	10.88	9.77	79.44	454 '

* INSUFFICIENT SAMPLE

@ CORRECTED FOR SULFUR

' SPIKED (SEE PROCEDURE IN ANALYTICAL TECHNIQUES)

TABLE 4 : ROCK-EVAL ANALYSIS - FLOAT-SINK FRACTIONS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
+2"							
1.60 FLOAT		NO SAMPLE					
1.80 FLOAT		NO SAMPLE					
2.00 FLOAT	0.06	13.05	123.44	445	14.46	0.10	854
2.20 FLOAT	0.06	10.34	82.51	442	10.22	0.11	807
2.40 FLOAT	0.06	9.17	55.24	438	7.28	0.14	759
2.60 FLOAT	0.00	1.11	16.16	438	2.15	0.06	752
2.60 SINK		NO SAMPLE					
-2" TO +1"							
1.60 FLOAT	0.00	5.59	79.44	438	10.39	0.07	765
1.80 FLOAT	0.00	9.41	114.44	443	13.72	0.08	834
2.00 FLOAT	0.00	9.86	124.13	446	13.98	0.07	888
2.20 FLOAT	0.00	10.82	82.02	443	10.16	0.12	807
2.40 FLOAT	0.00	8.81	53.81	439	7.34	0.14	733
2.60 FLOAT		NO SAMPLE					
2.60 SINK		NO SAMPLE					
-1" TO +1/2"							
1.60 FLOAT	0.00	9.80	160.71	444	18.07	0.06	889
1.80 FLOAT	0.00	8.79	121.14	443	14.49	0.07	836
2.00 FLOAT	0.00	8.58	99.86	443	11.97	0.08	834
2.20 FLOAT	0.00	9.39	80.00	444	9.85	0.11	812
2.40 FLOAT	0.00	7.54	50.00	439	6.88	0.13	727
2.60 FLOAT	0.00	1.77	14.93	441	1.93	0.11	774
2.60 SINK	0.00	0.69	3.84	433	1.23	0.15	312
-1/2" to +4m							
1.60 FLOAT	0.00	9.20	153.55	444	17.84	0.06	861
1.80 FLOAT	0.00	9.66	133.33	444	15.54	0.07	858
2.00 FLOAT	0.00	7.46	89.15	441	11.39	0.08	783
2.20 FLOAT	0.00	6.35	65.66	440	9.08	0.09	723
2.40 FLOAT	0.00	6.04	48.95	437	6.40	0.11	765
2.60 FLOAT	0.00	1.62	17.14	438	2.64	0.09	649
2.60 SINK	0.00	0.40	5.45	435	1.27	0.07	429

TABLE 4 : ROCK-EVAL ANALYSIS - FLOAT-SINK FRACTIONS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
-4 to +10m							
1.60 FLOAT	0.00	9.51	180.06	444	20.27	0.05	888
1.80 FLOAT	0.00	8.35	122.78	442	14.83	0.06	828
2.00 FLOAT	0.00	6.94	94.01	441	11.68	0.07	805
2.20 FLOAT	0.00	6.61	66.47	439	8.77	0.09	758
2.40 FLOAT	0.00	5.42	46.92	439	6.57	0.10	714
2.60 FLOAT	0.00	2.21	23.20	440	3.66	0.09	634
2.60 SINK	0.00	0.73	9.64	436	2.43	0.07	397
-10m TO +48m							
1.60 FLOAT	0.00	8.43	165.35	446	18.92	0.05	874
1.80 FLOAT	0.00	6.44	149.66	445	16.81	0.04	890
2.00 FLOAT	0.00	3.89	109.53	442	12.83	0.03	854
2.20 FLOAT	0.06	3.95	66.51	439	9.05	0.06	735
2.40 FLOAT	0.00	2.27	42.98	437	6.18	0.05	695
2.60 FLOAT	0.00	1.23	26.68	435	4.32	0.04	618
2.60 SINK	0.00	0.43	8.30	434	1.95	0.05	426
-48m TO +200m							
1.60 FLOAT*	0.00	20.13	324.32	446	44.56	0.06	728
1.80 FLOAT*	0.00	9.38	285.03	445	31.05	0.03	918
2.00 FLOAT*	0.00	4.00	214.18	445	23.13	0.02	926
2.20 FLOAT	0.00	5.31	127.15	441	15.63	0.04	813
2.40 FLOAT	0.20	6.86	58.13	437	8.56	0.11	679
2.60 FLOAT	0.03	3.14	28.40	435	4.84	0.10	587
2.60 SINK	0.00	0.27	4.94	434	1.84	0.05	268
-200m TO +400m							
1.60 FLOAT*	0.00	15.36	280.97	446	39.35	0.05	714
1.80 FLOAT*	0.00	13.48	269.82	447	29.31	0.05	921
2.00 FLOAT*	0.00	7.00	214.42	445	24.74	0.03	867
2.20 FLOAT	0.00	5.24	122.29	442	15.78	0.04	775
2.40 FLOAT	0.00	2.98	48.41	438	7.10	0.06	682
2.60 FLOAT	0.00	1.15	17.40	435	2.89	0.06	602
2.60 SINK	0.00	0.37	4.34	436	1.64	0.08	265

* CONTAMINATED

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES FLOAT-SINK FRACTIONS

		SiO2 wt%	Al2O3 wt%	TiO2 wt%	Fe2O3 wt%	MnO wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	SO3@ wt%	LOI wt%	TOTAL MAJORS
+ 2"	1.60f#													
	1.80f#													
	2.00f	43.0	11.7	0.58	4.44	0.08	2.26	5.20	1.37	2.04	0.25	1.40	29.2	101.5
	2.20f	43.3	11.5	0.57	4.82	0.09	3.37	8.70	1.32	2.03	0.64	2.27	23.4	102.0
	2.40f	45.4	13.0	0.64	6.23	0.10	2.52	7.48	1.73	2.43	0.63	5.77	19.8	105.7
	2.60f	13.5	3.06	0.14	2.02	0.11	0.59	42.8	0.14	0.46	0.16	0.00	36.8	99.8
	2.60s#													
-2" +1"	1.60f	55.4	12.3	0.64	4.23	0.10	1.57	2.37	1.46	1.73	0.65	0.00	20.0	100.5
	1.80f	49.8	12.6	0.62	4.08	0.08	1.59	3.09	1.05	1.79	0.51	0.70	25.1	101.0
	2.00f	40.1	10.3	0.52	5.52	0.09	2.19	9.16	1.02	1.51	0.38	4.59	27.8	103.2
	2.20f	43.5	12.2	0.59	5.20	0.11	2.67	7.35	1.67	2.23	0.74	1.85	23.1	101.2
	2.40f	41.5	12.0	0.60	5.57	0.12	4.85	8.59	1.34	2.29	0.60	1.65	22.2	101.3
	2.60f#													
	2.60s#													
-1" +1/2"	1.60f	41.0	11.8	0.57	4.64	0.05	1.60	4.05	0.75	1.88	0.60	1.00	33.2	101.1
	1.80f	45.9	11.2	0.57	4.45	0.07	1.51	4.78	1.04	1.63	0.62	0.95	27.4	100.1
	2.00f	47.9	12.2	0.60	4.35	0.07	1.76	5.58	1.04	1.84	0.49	1.12	23.9	100.9
	2.20f	44.8	12.8	0.60	4.77	0.09	2.35	7.83	1.37	2.25	0.43	1.75	22.7	101.7
	2.40f	46.4	13.3	0.66	5.63	0.11	3.00	6.73	1.55	2.48	0.44	2.67	18.4	101.4
	2.60f	12.9	3.44	0.15	2.52	0.11	2.39	39.9	0.20	0.65	0.23	0.02	37.1	99.6
	2.60s#													
-1/2" +4m	1.60f	44.2	11.4	0.57	4.71	0.07	1.43	2.37	0.93	1.69	0.35	0.82	31.9	100.6
	1.80f	45.7	11.5	0.58	4.30	0.07	1.65	3.88	1.10	1.72	0.57	1.07	28.5	100.6
	2.00f	49.4	13.2	0.64	4.75	0.07	1.75	4.22	1.05	2.03	0.51	0.85	22.4	100.9
	2.20f	46.5	13.4	0.63	4.81	0.08	2.26	7.39	1.32	2.37	0.45	1.57	20.6	101.4
	2.40f	43.2	12.6	0.63	5.37	0.11	3.26	9.62	1.26	2.36	0.49	2.12	20.1	101.1
	2.60f	20.1	5.47	0.31	5.12	0.18	4.31	30.9	1.00	1.05	0.20	1.52	31.1	101.5
	2.60s#											8.09		

# INSUFFICIENT SAMPLE

@ CALCULATED FROM LECO WT.PERCENT SULPHUR

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES FLOAT-SINK FRACTIONS

		SiO2 wt%	Al2O3 wt%	TiO2 wt%	Fe2O3 wt%	MnO wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	SO3@ wt%	LOI wt%	TOTAL MAJORS
-4m +10m	1.60f	43.2	10.3	0.60	4.60	0.06	1.26	2.27	1.20	1.41	0.60	1.12	34.5	101.1
	1.80f	48.0	12.3	0.61	4.48	0.08	1.51	2.90	1.07	1.84	0.58	0.87	26.5	100.7
	2.00f	49.8	13.2	0.64	4.56	0.08	1.69	3.84	1.05	2.04	0.54	0.87	22.6	100.9
	2.20f	49.8	14.4	0.69	4.72	0.08	2.05	5.06	1.26	2.51	0.51	1.35	19.2	101.6
	2.40f	45.6	13.3	0.67	5.42	0.11	3.26	7.62	1.33	2.49	0.53	2.07	19.0	101.4
	2.60f	28.5	7.82	0.40	5.33	0.14	5.41	22.7	0.44	1.45	0.36	1.15	27.5	101.2
	2.60s#													
-10m +48m	1.60f	41.9	10.6	0.60	4.57	0.10	1.30	2.90	1.15	1.46	0.53	1.10	35.5	101.7
	1.80f	44.0	11.2	0.62	4.55	0.10	1.53	3.59	1.30	1.57	0.55	1.27	31.1	101.4
	2.00f	47.4	12.7	0.62	4.35	0.10	1.65	3.43	1.06	1.96	0.57	0.97	26.1	100.9
	2.20f	51.1	14.3	0.68	4.38	0.09	1.71	3.19	1.21	2.28	0.53	0.95	20.1	100.5
	2.40f	49.2	14.6	0.71	4.80	0.10	2.20	4.51	1.33	2.55	0.49	1.55	18.0	100.0
	2.60f	43.4	12.6	0.62	5.36	0.12	3.36	10.3	0.92	2.23	0.47	1.57	18.7	99.7
	2.60s	24.2	5.02	0.28	6.43	0.15	3.67	29.9	0.20	0.85	0.72	5.22	24.9	101.5
-48m +200m	1.60f#											1.77		
	1.80f#											1.95		
	2.00f	38.9	10.1	0.58	4.28	0.10	1.45	3.71	1.15	1.45	0.60	1.72	37.8	101.8
	2.20f	46.2	13.0	0.63	4.25	0.12	1.65	3.33	0.94	2.01	0.67	1.07	27.4	101.3
	2.40f	50.2	14.6	0.69	4.48	0.16	1.73	4.24	0.97	2.34	0.58	2.67	20.2	102.9
	2.60f	52.8	15.1	0.70	4.84	0.20	2.08	4.98	0.98	2.48	0.45	1.37	15.3	101.3
	2.60s	39.0	4.78	0.34	9.42	0.16	1.92	21.5	0.21	0.75	0.55	11.58	13.7	103.9
-200m +400m	1.60f#													
	1.80f#													
	2.00f#											1.32		
	2.20f	44.1	12.6	0.70	4.92	0.14	1.60	3.17	1.13	1.76	0.69	1.40	29.2	101.4
	2.40f	50.4	14.4	0.66	4.48	0.18	1.68	4.85	1.08	2.26	0.52	2.97	19.3	102.8
	2.60f	53.2	11.0	0.53	4.37	0.22	1.82	9.81	0.92	1.79	0.37	1.67	15.0	100.7
	2.60s	28.8	4.56	0.84	18.3	0.25	2.29	17.3	0.63	0.81	0.38	24.4	12.8	111.3

INSUFFICIENT SAMPLE

@ CALCULATED FROM LECO WT.PERCENT SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - MAJOR ELEMENTS - FLOAT-SINK FRACTIONS - CARBONATES CALCULATED

CALCULATED		Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	MgCO3 wt.%	CaCO3 wt.%
+2"	1.60f*													
	1.80f*													
	2.00f	20.1	6.19	0.35	3.1	0.062	1.36	3.7	1.02	1.7	0.11	0.56	4.73	9.28
	2.20f	20.2	6.09	0.34	3.4	0.070	2.03	6.2	0.98	1.7	0.28	0.91	7.05	15.53
	2.40f	21.2	6.88	0.38	4.4	0.077	1.52	5.3	1.28	2.0	0.27	2.31	5.27	13.35
	2.60f	6.31	1.62	0.08	1.4	0.085	0.36	30.6	0.10	0.4	0.07	0.00	1.23	76.39
	2.60s*													
-2" +1"	1.60f	25.9	6.51	0.38	3.0	0.077	0.95	1.7	1.08	1.4	0.28	0.00	3.28	4.23
	1.80f	23.3	6.67	0.37	2.9	0.062	0.96	2.2	0.78	1.5	0.22	0.28	3.33	5.52
	2.00f	18.7	5.45	0.31	3.9	0.070	1.32	6.5	0.76	1.3	0.17	1.84	4.58	16.35
	2.20f	20.3	6.46	0.35	3.6	0.085	1.61	5.3	1.24	1.9	0.32	0.74	5.59	13.12
	2.40f	19.4	6.35	0.36	3.9	0.093	2.93	6.1	0.99	1.9	0.26	0.66	10.15	15.33
	2.60f*													
	2.60s*													
-1" +1/2"	1.60f	19.2	6.25	0.34	3.2	0.039	0.97	2.9	0.56	1.6	0.26	0.40	3.35	7.23
	1.80f	21.5	5.93	0.34	3.1	0.054	0.91	3.4	0.77	1.4	0.27	0.38	3.16	8.53
	2.00f	22.4	6.46	0.36	3.0	0.054	1.06	4.0	0.77	1.5	0.21	0.45	3.68	9.96
	2.20f	20.9	6.78	0.36	3.3	0.070	1.42	5.6	1.02	1.9	0.19	0.70	4.92	13.98
	2.40f	21.7	7.04	0.40	3.9	0.085	1.81	4.8	1.15	2.1	0.19	1.07	6.28	12.01
	2.60f	6.03	1.02	0.09	1.8	0.085	1.44	28.5	0.15	0.5	0.10	0.01	5.00	71.22
	2.60s*											14.40		
-1/2" +4m	1.60f	20.7	6.03	0.34	3.3	0.054	0.86	1.7	0.69	1.4	0.24	0.33	2.99	4.23
	1.80f	21.4	6.09	0.35	3.0	0.054	1.00	2.8	0.82	1.4	0.25	0.43	3.45	6.93
	2.00f	23.1	6.99	0.38	3.3	0.054	1.06	3.0	0.78	1.7	0.22	0.34	3.66	7.53
	2.20f	21.7	7.09	0.38	3.4	0.062	1.36	5.3	0.98	2.0	0.20	0.63	4.73	13.19
	2.40f	20.2	6.67	0.38	3.8	0.085	1.97	6.9	0.93	2.0	0.21	0.85	6.82	17.17
	2.60f	9.4	2.90	0.19	3.6	0.139	2.72	22.1	0.74	0.9	0.09	0.61	9.44	55.15
	2.60s*											3.24		

* INSUFFICIENT SAMPLE

@ LECO WEIGHT PERCENT SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - MAJOR ELEMENTS - FLOAT-SINK FRACTIONS - CARBONATES CALCULATED

CALCULATED		Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	MgCO3 wt.%	CaCO3 wt.%
-4m +10m	1.60f	20.2	5.45	0.36	3.2	0.046	0.76	1.6	0.89	1.2	0.26	0.45	2.64	4.05
	1.80f	22.4	6.51	0.37	3.1	0.062	0.91	2.1	0.79	1.5	0.25	0.35	3.16	5.18
	2.00f	23.3	6.99	0.38	3.2	0.062	1.02	2.7	0.78	1.7	0.24	0.35	3.54	6.85
	2.20f	23.3	7.62	0.41	3.3	0.062	1.24	3.6	0.93	2.1	0.22	0.54	4.29	9.03
	2.40f	21.3	7.04	0.40	3.8	0.085	1.97	5.4	0.99	2.1	0.23	0.83	6.82	13.60
	2.60f	13.3	4.14	0.24	3.7	0.108	3.26	16.2	0.33	1.2	0.16	0.46	11.32	40.52
	2.60s*											8.39		
-10m +48m	1.60f	19.6	5.61	0.36	3.2	0.077	0.78	2.1	0.85	1.2	0.23	0.44	2.72	5.18
	1.80f	20.6	5.93	0.37	3.2	0.077	0.92	2.6	0.96	1.3	0.24	0.51	3.20	6.41
	2.00f	22.2	6.72	0.37	3.0	0.077	1.00	2.5	0.79	1.6	0.25	0.39	3.45	6.12
	2.20f	23.9	7.57	0.41	3.1	0.070	1.03	2.3	0.90	1.9	0.23	0.38	3.58	5.69
	2.40f	23.0	7.73	0.43	3.4	0.077	1.33	3.2	0.99	2.1	0.21	0.62	4.60	8.05
	2.60f	20.3	6.67	0.37	3.7	0.093	2.03	7.4	0.68	1.9	0.21	0.63	7.03	18.38
	2.60s	11.3	2.66	0.17	4.5	0.116	2.21	21.4	0.15	0.7	0.31	2.09	7.68	53.37
-48m +200m	1.60f*											0.71		
	1.80f*											0.78		
	2.00f	18.2	5.35	0.35	3.0	0.077	0.87	2.7	0.85	1.2	0.26	0.69	3.03	6.62
	2.20f	21.6	6.88	0.38	3.0	0.093	1.00	2.4	0.70	1.7	0.29	0.43	3.45	5.94
	2.40f	23.5	7.73	0.41	3.1	0.124	1.04	3.0	0.72	1.9	0.25	1.07	3.62	7.57
	2.60f	24.7	7.99	0.42	3.4	0.155	1.25	3.6	0.73	2.1	0.20	0.55	4.35	8.89
	2.60s	18.2	2.53	0.20	6.6	0.124	1.16	15.4	0.16	0.6	0.24	4.64	4.02	38.37
-200m +400m	1.60f*													
	1.80f*													
	2.00f*											0.53		
	2.20f	20.6	6.67	0.42	3.4	0.108	0.97	2.3	0.84	1.5	0.30	0.56	3.35	5.66
	2.40f	23.6	7.62	0.40	3.1	0.139	1.01	3.5	0.80	1.9	0.23	1.19	3.52	8.66
	2.60f	24.9	5.82	0.32	3.1	0.170	1.10	7.0	0.68	1.5	0.16	0.67	3.81	17.51
	2.60s	13.5	2.41	0.30	12.8	0.194	1.38	12.4	0.47	0.7	0.17	9.77	4.79	30.88

* INSUFFICIENT SAMPLE

@ LECO WEIGHT PERCENT SULPHUR

		Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
+ 2"	1.60f*							
	1.80f*							
	2.00f	70	80	370	<10	80	20	390
	2.20f	70	100	650	20	90	20	390
	2.40f	70	110	540	20	100	10	460
	2.60f	<10	20	770	<10	<10	10	80
	2.60s*							
-2" +1"	1.60f	50	100	220	10	130	20	390
	1.80f	80	100	260	20	110	<10	340
	2.00f	60	70	450	20	80	10	250
	2.20f	70	90	520	30	100	<10	420
	2.40f	70	100	690	20	90	10	440
	2.60f*							
	2.60s*							
-1" +1/2"	1.60f	90	100	290	10	80	20	320
	1.80f	70	90	310	20	90	20	320
	2.00f	80	90	330	30	90	10	330
	2.20f	70	100	480	20	90	20	410
	2.40f	70	100	480	10	110	<10	450
	2.60f	<10	20	830	10	<10	10	100
	2.60s*							
-1/2" +4m	1.60f	100	100	200	40	90	20	330
	1.80f	80	90	260	30	90	10	310
	2.00f	90	110	260	20	100	20	390
	2.20f	70	100	430	40	80	10	460
	2.40f	70	90	520	20	80	20	450
	2.60f	<10	50	1050	30	70	20	100
	2.60s*							

* INSUFFICIENT SAMPLE

		Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
-4m +10m	1.60f	90	110	260	30	120	30	500
	1.80f	80	100	240	30	110	20	370
	2.00f	90	110	280	30	110	<10	380
	2.20f	80	120	370	<10	110	20	500
	2.40f	80	120	530	10	100	10	460
	2.60f	40	60	920	<10	20	10	240
	2.60s*							
-10m +40m	1.60f	100	100	260	20	120	20	560
	1.80f	90	120	300	30	130	20	490
	2.00f	100	120	270	20	100	10	410
	2.20f	90	130	250	10	110	30	410
	2.40f	80	120	340	20	110	10	440
	2.60f	70	120	560	10	70	10	380
	2.60s	20	40	****	20	10	10	230
-40m +200m	1.60f*							
	1.80f*							
	2.00f	80	120	340	<10	130	20	570
	2.20f	80	110	290	20	100	10	430
	2.40f	90	120	270	10	100	20	500
	2.60f	90	120	330	20	110	20	480
	2.60s	30	40	680	10	40	10	210
-200m +400m	1.60f*							
	1.80f*							
	2.00f*							
	2.20f	90	130	310	30	150	40	680
	2.40f	80	110	290	30	100	20	500
	2.60f	60	80	430	10	70	20	400
	2.60s	40	50	870	30	560	20	280

* INSUFFICIENT SAMPLE

TABLE 8A : FLOAT-SINK CUMULATIVE DATA +2" SIEVE FRACTION

RELATIVE SPECIFIC-GRAVITY FRACTIONS	ELEMENTARY DATA MASS %	ASH %	SULPHUR %	BTU/lb*	CUMULATIVE DATA FLOAT MASS %	ASH %	SULPHUR %	BTU/lb*	SINK MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	@											
1.60-1.80	@											
1.80-2.00	10.52	71.55	0.56	3619	10.52	71.55	0.56	3619	100.00	77.09	1.99	2083
2.00-2.20	45.29	75.73	2.20	2205	55.81	74.94	1.89	2471	89.48	77.74	2.15	1902
2.20-2.40	40.34	81.36	2.31	1667	96.15	77.63	2.07	2134	44.19	79.80	2.11	1591
2.40-2.60	3.85	63.45	0.00	797	100.00	77.09	1.99	2083	3.85	63.45	0.00	797
2.60-SINKS	@											

* CORRECTED FOR SULFUR

@ NO SAMPLE RECOVERED

TABLE 8B : FLOAT-SINK CUMULATIVE DATA +2" SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY FRACTIONS	ELEMENTARY DATA MASS %	S1 (mg/g)	S2 (mg/g)	T.O.C.	CUMULATIVE DATA FLOAT MASS %	S1 (mg/g)	S2 (mg/g)	T.O.C.	SINK MASS %	S1 (mg/g)	S2 (mg/g)	T.O.C.
FLOAT-1.60	@											
1.60-1.80	@											
1.80-2.00	10.52	13.05	123.44	14.46	10.52	13.05	123.44	14.46	100.00	9.80	73.26	9.17
2.00-2.20	45.29	10.34	82.51	10.22	55.81	10.85	90.23	11.02	89.48	9.42	67.36	8.55
2.20-2.40	40.34	9.17	55.24	7.28	96.15	10.15	75.55	9.45	44.19	8.47	51.84	6.83
2.40-2.60	3.85	1.11	16.16	2.15	100.00	9.80	73.26	9.17	3.85	1.11	16.16	2.15
2.60-SINKS	@											

@ NO SAMPLE RECOVERED

TABLE 8C : FLOAT-SINK - CUMULATIVE DATA +2" SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	#											
1.60-1.80	#											
1.80-2.00	10.52	18.55	6.94	28.09	10.52	18.55	6.94	28.09	100.00	12.26	8.25	22.87
2.00-2.20	45.29	13.57	8.67	24.27	55.81	14.31	8.34	24.99	89.48	11.53	8.40	22.26
2.20-2.40	40.34	9.16	6.80	18.64	96.15	12.26	7.70	22.33	44.19	9.43	8.12	20.19
2.40-2.60	3.85	12.25	21.96	36.47	100.00	12.26	8.25	22.87	3.85	12.25	21.96	36.47
2.60-SINKS	#											

NO SAMPLE RECOVERED

TABLE 8D : FLOAT-SINK - CUMULATIVE DATA +2" SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$
FLOAT-1.60	#								
1.60-1.80	#								
1.80-2.00	10.52	9.24	4.73	10.52	9.24	4.73	100.00	16.34	5.86
2.00-2.20	45.29	15.48	7.05	55.81	14.35	6.61	89.48	17.17	6.00
2.20-2.40	40.34	13.23	5.27	96.15	13.93	6.05	44.19	18.84	4.92
2.40-2.60	3.85	76.41	1.23	100.00	16.34	5.86	3.85	76.41	1.23
2.60-SINKS	#								

NO SAMPLE RECOVERED

TABLE 9A: FLOAT SINK CUMULATIVE DATA -2" + 1" SIEVE FRACTION

RELATIVE SPECIFIC-GRAVITY FRACTIONS	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	0.77	81.81	0.00	2239	0.77	81.81	0.00	2239	100.00	74.49	0.87	2010
1.60-1.80	1.27	76.66	0.28	3241	2.04	78.60	0.17	2863	99.23	74.43	0.87	2008
1.80-2.00	15.01	76.47	1.84	3375	17.05	76.73	1.64	3314	97.96	74.40	0.88	1992
2.00-2.20	50.44	72.11	0.74	2317	67.49	73.28	0.97	2569	82.95	74.03	0.71	1742
2.20-2.40	32.51	77.00	0.66	849	100.00	74.49	0.87	2010	32.51	77.00	0.66	849
2.40-2.60	#											
2.60-SINKS	#											

* CORRECTED FOR SULFUR

# NO SAMPLE RECOVERED

TABLE 9B : FLOAT SINK CUMULATIVE DATA -2" + 1" SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY FRACTIONS					FLOAT				SINK			
	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	0.77	5.59	79.44	10.39	0.77	5.59	79.44	10.39	100.00	9.96	79.56	9.86
1.60-1.80	1.27	9.41	114.44	13.72	2.04	7.97	101.23	12.46	99.23	10.00	79.56	9.86
1.80-2.00	15.01	9.86	124.13	13.90	17.05	9.63	121.39	13.80	97.96	10.01	79.11	9.81
2.00-2.20	50.44	10.82	82.02	10.16	67.49	10.52	91.97	11.08	82.95	10.03	70.96	9.05
2.20-2.40	32.51	8.81	53.81	7.34	100.00	9.96	79.56	9.86	32.51	8.81	53.81	7.34
2.40-2.60	#											
2.60-SINKS	#											

# NO SAMPLE RECOVERED

TABLE 9C : FLOAT-SINK - CUMULATIVE DATA -2"+1" SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	0.77	11.94	4.49	18.19	0.77	11.94	4.49	18.19	100.00	13.17	8.18	23.97
1.60-1.80	1.27	16.96	4.98	23.23	2.04	15.07	4.80	21.33	99.23	13.18	8.21	24.01
1.80-2.00	15.01	17.46	7.85	27.09	17.05	17.17	7.48	27.10	97.96	13.13	8.25	24.02
2.00-2.20	50.44	13.13	7.76	23.53	67.49	14.15	7.69	24.43	82.95	12.35	8.32	23.32
2.20-2.40	32.51	11.14	9.20	23.00	100.00	13.17	8.18	23.97	32.51	11.14	9.20	23.00
2.40-2.60	#											
2.60-SINKS	#											

NO SAMPLE RECOVERED

TABLE 9D : FLOAT-SINK - CUMULATIVE DATA -2"+1" SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3
FLOAT-1.60	0.77	4.23	3.28	0.77	4.23	3.28	100.00	14.16	6.87
1.60-1.80	1.27	5.52	3.33	2.04	5.03	3.31	99.23	14.24	6.90
1.80-2.00	15.01	16.35	4.58	1.00	15.00	4.43	97.96	14.35	6.95
2.00-2.20	50.44	13.12	5.59	67.49	13.59	5.30	82.95	14.01	7.38
2.20-2.40	32.51	15.33	10.15	100.00	14.16	6.87	32.51	15.23	10.15
2.40-2.60	#								
2.60-SINKS	#								

NO SAMPLE RECOVERED

TABLE 10A : FLOAT-SINK CUMULATIVE DATA -1"+1/2" SIEVE FRACTION

RELATIVE SPECIFIC-GRAVITY FRACTIONS	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	1.10	68.82	0.40	4656	1.10	68.82	0.40	4656	100.00	77.38	0.74	2200
1.60-1.80	9.99	74.87	0.38	3441	11.09	74.27	0.38	3561	98.90	77.47	0.75	2173
1.80-2.00	21.15	77.77	0.45	2750	32.24	76.57	0.43	3029	88.91	77.43	0.79	2031
2.00-2.20	36.12	77.22	0.70	2168	68.36	76.91	0.57	2574	67.76	77.76	0.90	1806
2.20-2.40	27.50	80.59	1.07	1462	95.86	77.97	0.71	2255	31.64	78.39	1.12	1392
2.40-2.60	3.73	62.71	0.01	975	99.59	77.40	0.69	2207	4.14	63.74	1.44	931
2.60-SINKS	0.41	73.16	14.48	535	100.00	77.38	0.74	2200	0.41	73.16	14.48	535

TABLE 10B : FLOAT-SINK CUMULATIVE DATA -1"+1/2" SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY FRACTIONS					FLOAT				SINK			
	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	1.10	9.80	160.71	18.07	1.10	9.80	160.71	18.07	100.00	8.33	78.21	9.70
1.60-1.80	9.99	8.79	121.14	14.49	11.09	8.89	125.06	14.85	98.90	8.32	77.29	9.61
1.80-2.00	21.15	8.58	99.86	11.97	32.24	8.69	108.53	12.96	88.91	8.26	72.36	9.06
2.00-2.20	36.12	9.39	80.00	9.85	68.36	9.06	93.46	11.32	67.76	8.16	63.78	8.16
2.20-2.40	27.50	7.54	50.00	6.88	95.86	8.62	80.99	10.04	31.64	6.76	45.27	6.22
2.40-2.60	3.73	1.70	14.93	1.93	99.59	8.36	78.51	9.74	4.14	1.60	13.83	1.86
2.60-SINKS	0.41	0.69	3.84	1.23	100.00	8.33	78.21	9.70	0.41	0.69	3.84	1.23

TABLE 10C : FLOAT-SINK - CUMULATIVE DATA -1"+-1/2" SIEVE FRACTION CARBON,OXYGEN,VOLATILES

	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	1.10	22.50	5.90	30.88	1.10	22.50	5.90	30.88	100.00	12.55	6.82	22.45
1.60-1.80	9.99	17.98	5.33	24.17	11.09	18.43	5.39	24.84	98.90	12.44	6.83	22.35
1.80-2.00	21.15	14.41	5.86	21.08	32.24	15.79	5.70	22.90	88.91	11.82	7.00	22.15
2.00-2.20	36.12	12.12	6.46	22.78	68.36	13.85	6.10	22.84	67.76	11.01	7.35	22.24
2.20-2.40	27.50	9.45	6.64	19.41	95.86	12.59	6.26	21.85	31.64	9.73	8.37	21.61
2.40-2.60	3.73	12.03	20.41	37.29	99.59	12.57	6.79	22.43	4.14	11.62	19.90	36.26
2.60-SINKS	0.41	7.86	15.22	26.84	100.00	12.55	6.82	22.45	0.41	7.86	15.22	26.84

TABLE 10D : FLOAT-SINK - CUMULATIVE DATA -1"+1/2" mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

	ELEMENTARY DATA			CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3
FLOAT-1.60	1.10	7.23	3.35	1.10	7.23	3.35	100.00		
1.60-1.80	9.99	8.53	3.16	11.09	8.40	3.18	98.90		
1.80-2.00	21.15	9.96	3.68	32.24	9.42	3.51	88.91		
2.00-2.20	36.12	13.98	4.92	68.36	11.83	4.25	67.76		
2.20-2.40	27.50	12.01	6.28	95.86	11.80	4.84	31.64		
2.40-2.60	3.73	71.22	5.00	99.59	14.10	4.84	4.14		
2.60-SINKS	0.41			100.00			0.41		

TABLE 11A : FLOAT-SINK CUMULATIVE DATA -1/2+4 mesh SIEVE FRACTION

ELEMENTARY DATA					CUMULATIVE DATA							
RELATIVE SPECIFIC-GRAVITY					FLOAT				SINK			
FRACTIONS	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	2.48	69.70	0.33	4514	2.48	69.70	0.33	4514	100.00		0.60	2113
1.60-1.80	8.59	73.01	0.43	3751	11.07	72.27	0.41	3922	97.52		0.60	2052
1.80-2.00	24.29	78.90	0.34	2516	35.36	76.82	0.36	2956	88.93		0.62	1888
2.00-2.20	36.67	79.42	0.63	1844	72.03	78.15	0.50	2390	64.64		0.73	1652
2.20-2.40	25.16	79.50	0.85	1524	97.19	78.50	0.59	2166	27.97		0.85	1401
2.40-2.60	2.54	69.03	0.61	321	99.73	78.26	0.59	2119	2.81		0.86	302
2.60-SINKS	0.27	@	3.24	122	100.00		0.60	2113	0.27		3.24	122

* CORRECTED FOR SULFUR

@ INSUFFICIENT SAMPLE

TABLE 11B : FLOAT-SINK CUMULATIVE DATA -1/2+4 mesh SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY					FLOAT				SINK			
FRACTIONS	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	2.48	9.20	153.55	17.84	2.48	9.20	153.55	17.84	100.00	6.76	73.76	9.55
1.60-1.80	8.59	9.66	133.33	15.54	11.07	9.56	137.86	16.06	97.52	6.70	71.73	9.34
1.80-2.00	24.29	7.46	89.15	11.39	35.36	8.12	104.40	12.85	88.93	6.41	65.78	8.75
2.00-2.20	36.67	6.35	65.66	9.08	72.03	7.22	84.68	10.93	64.64	6.02	57.00	7.75
2.20-2.40	25.16	6.04	48.95	6.40	97.19	6.91	75.43	9.76	27.97	5.58	45.64	6.01
2.40-2.60	2.54	1.62	17.14	2.64	99.73	6.78	73.94	9.58	2.81	1.50	16.02	2.51
2.60-SINKS	0.27	0.40	5.45	1.27	100.00	6.76	73.76	9.55	0.27	0.40	5.45	1.27

TABLE 11C : FLOAT-SINK - CUMULATIVE DATA -1/2"+4 mesh SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	2.48	21.91	6.64	28.44	2.48	21.91	6.64	28.44	100.00	12.21	6.93	
1.60-1.80	8.59	18.41	5.84	25.89	11.07	19.19	6.02	26.46	97.52	11.96	6.94	
1.80-2.00	24.29	12.96	5.41	20.85	35.36	14.91	5.60	22.61	88.93	11.34	7.05	
2.00-2.20	36.67	11.41	6.64	21.10	72.03	13.13	6.13	21.04	64.64	10.73	7.66	
2.20-2.40	25.16	9.77	7.94	21.39	97.19	12.26	6.60	21.72	27.97	9.83	9.01	
2.40-2.60	2.54	10.34	18.01	31.00	99.73	12.21	6.89	21.96	2.81	10.39	18.55	
2.60-SINKS	0.27	10.91	23.67		100.00	12.21	6.93		0.27	10.91	23.67	

TABLE 11D : FLOAT-SINK - CUMULATIVE DATA -1/2"+4 mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3
FLOAT-1.60	2.48	4.23	2.99	2.48	4.23	2.99	100.00		
1.60-1.80	8.59	6.93	3.45	11.07	6.33	3.35	97.52		
1.80-2.00	24.29	7.53	3.66	35.36	7.15	3.56	88.93		
2.00-2.20	36.67	13.19	4.73	72.03	10.23	4.16	64.64		
2.20-2.40	25.16	17.17	6.82	97.19	12.02	4.85	27.97		
2.40-2.60	2.54	55.15	9.44	99.73	13.12	4.96	2.81		
2.60-SINKS	0.27			100.00			0.27		

TABLE 12A : FLOAT-SINK CUMULATIVE DATA -4+10 mesh SIEVE FRACTION

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	1.04	68.17	0.45	5049	1.04	68.17	0.45	5049	100.00	79.94	0.61	1808
1.60-1.80	9.43	76.25	0.35	3420	10.47	75.45	0.36	3582	98.96	80.06	0.61	1774
1.80-2.00	19.32	79.38	0.35	2565	29.79	78.00	0.35	2922	89.53	80.46	0.64	1600
2.00-2.20	43.08	81.82	0.54	1691	72.87	80.26	0.46	2194	70.21	80.76	0.72	1335
2.20-2.40	22.48	80.35	0.83	831	95.35	80.28	0.55	1873	27.13	79.08	1.01	769
2.40-2.60	3.82	72.77	0.46	499	99.17	79.99	0.55	1820	4.65	72.93	1.88	469
2.60-SINKS	0.83	73.67	8.39	331	100.00	79.94	0.61	1808	0.83	73.67	8.39	331

* CORRECTED FOR SULPHUR

TABLE 12B : FLOAT-SINK CUMULATIVE DATA -4+10 mesh SIEVE FRACTION ROCK-EVAL

					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	1.04	9.51	180.06	20.27	1.04	9.51	180.06	20.27	100.00	6.38	71.76	9.28
1.60-1.80	9.43	8.35	122.78	14.83	10.47	8.47	128.47	15.37	98.96	6.35	70.62	9.17
1.80-2.00	19.32	6.94	94.01	11.68	29.79	7.48	106.12	12.98	89.53	6.14	65.13	8.57
2.00-2.20	43.08	6.61	66.47	8.77	72.87	6.96	82.68	10.49	70.21	5.92	57.18	7.71
2.20-2.40	22.48	5.42	46.92	6.57	95.35	6.60	74.25	9.57	27.13	4.82	42.44	6.03
2.40-2.60	3.82	2.21	23.20	3.66	99.17	6.43	72.28	9.34	4.65	1.95	20.78	3.44
2.60-SINKS	0.83	0.73	9.64	2.43	100.00	6.38	71.76	9.28	0.83	0.73	9.64	2.43

TABLE 12C : FLOAT-SINK - CUMULATIVE DATA -4+10 mesh SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	1.04	25.55	6.24	30.85	1.04	25.55	6.24	30.85	100.00	11.83	6.77	19.80
1.60-1.80	9.43	17.46	5.31	22.81	10.47	18.26	5.40	23.61	98.96	11.69	6.78	19.68
1.80-2.00	19.32	13.66	5.69	19.77	29.79	15.28	5.59	21.12	89.53	11.08	6.93	19.35
2.00-2.20	43.08	10.78	6.18	18.18	72.87	12.62	5.94	19.38	70.21	10.37	7.27	19.24
2.20-2.40	22.48	9.63	7.73	19.65	95.35	11.91	6.36	19.44	27.13	9.72	9.01	20.92
2.40-2.60	3.82	10.43	14.72	27.23	99.17	11.86	6.68	19.74	4.65	10.15	15.19	27.07
2.60-SINKS	0.83	8.87	17.35	26.33	100.00	11.83	6.77	19.80	0.83	8.87	17.35	26.33

TABLE 12D : FLOAT-SINK - CUMULATIVE DATA -4+10 mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3
FLOAT-1.60	1.04	4.05	2.64	1.04	4.05	2.64	100.00		
1.60-1.80	9.43	5.18	3.16	10.47	5.07	3.11	98.96		
1.80-2.00	19.32	6.85	3.54	29.79	6.22	3.39	89.53		
2.00-2.20	43.08	9.03	4.29	72.87	7.88	3.92	70.21		
2.20-2.40	22.48	13.60	6.82	95.35	8.23	4.60	27.13		
2.40-2.60	3.82	40.52	11.32	99.17	10.44	4.86	4.65		
2.60-SINKS	0.83			100.00			0.83		

TABLE 13A : FLOAT-SINK CUMULATIVE DATA -10+48 mesh SIEVE FRACTION

RELATIVE SPECIFIC-GRAVITY FRACTIONS	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	0.98	66.93	0.44	5138	0.98	66.93	0.44	5138	100.00	81.04	0.55	1734
1.60-1.80	1.91	69.66	0.51	4311	2.89	68.73	0.49	4591	99.02	81.18	0.56	1700
1.80-2.00	10.73	76.06	0.39	3171	13.62	74.51	0.41	3472	97.11	81.41	0.56	1649
2.00-2.20	34.96	82.12	0.38	1870	48.58	79.99	0.39	2319	86.38	82.07	0.58	1460
2.20-2.40	34.10	83.32	0.62	1144	82.68	81.36	0.48	1835	51.42	82.04	0.71	1181
2.40-2.60	14.20	80.47	0.63	1300	96.88	81.23	0.51	1756	17.32	79.53	0.89	1253
2.60-SINKS	3.12	75.23	2.09	1041	100.00	81.04	0.55	1734	3.12	75.23	2.09	1041

* CORRECTED FOR SULPHUR
@ INSUFFICIENT SAMPLE

TABLE 13B : FLOAT-SINK CUMULATIVE DATA -10+48 mesh SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY FRACTIONS					FLOAT				SINK			
	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	0.98	8.43	165.35	18.92	0.98	8.43	165.35	18.92	100.00	2.98	58.19	7.83
1.60-1.80	1.91	6.44	149.66	16.81	2.89	7.11	154.98	17.53	99.02	2.93	57.13	7.72
1.80-2.00	10.73	3.89	109.53	12.83	13.62	4.57	119.17	13.83	97.11	2.86	55.31	7.54
2.00-2.20	34.96	3.95	66.51	9.05	48.58	4.13	81.28	10.39	86.38	2.73	48.57	6.88
2.20-2.40	34.10	2.27	42.98	6.18	82.68	3.36	65.48	8.65	51.42	1.90	36.37	5.41
2.40-2.60	14.20	1.32	26.68	4.32	96.88	3.06	59.79	8.02	17.32	1.16	23.37	3.89
2.60-SINKS	3.12	0.43	8.30	1.95	100.00	2.98	58.19	7.83	3.12	0.43	8.30	1.95

TABLE 13C : FLOAT-SINK - CUMULATIVE DATA -10+48 mesh SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	0.98	25.35	6.35	32.28	0.98	25.35	6.35	32.28	100.00	10.39	6.22	18.62
1.60-1.80	1.91	22.29	6.23	30.34	2.89	23.33	6.27	31.00	99.02	10.24	6.22	18.48
1.80-2.00	10.73	16.45	5.39	22.45	13.62	17.91	5.58	24.26	97.11	10.00	6.22	18.25
2.00-2.20	34.96	10.54	4.94	17.39	48.58	12.61	5.12	19.32	86.38	9.20	6.32	17.73
2.20-2.40	34.10	8.55	5.82	16.68	82.68	10.93	5.41	18.23	51.42	8.29	7.26	17.96
2.40-2.60	14.20	7.54	9.16	19.53	96.88	10.44	5.96	18.42	17.32	7.78	10.11	20.47
2.60-SINKS	3.12	8.89	14.41	24.77	100.00	10.39	6.22	18.62	3.12	8.89	14.41	24.77

TABLE 13D : FLOAT-SINK - CUMULATIVE DATA -10+48 mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$
FLOAT-1.60	0.98	5.24	2.72	0.98	5.24	2.72	100.00	9.87	4.52
1.60-1.80	1.91	6.49	3.20	2.89	6.07	3.04	99.02	9.91	4.53
1.80-2.00	10.73	6.24	3.45	13.62	6.20	3.36	97.11	9.98	4.56
2.00-2.20	34.96	5.74	3.58	48.58	5.87	3.52	86.38	10.45	4.70
2.20-2.40	34.10	7.99	4.60	82.68	6.74	3.96	51.42	13.64	5.46
2.40-2.60	14.20	18.48	7.03	96.88	8.46	4.41	17.32	24.78	7.15
2.60-SINKS	3.12	53.44	7.68	100.00	9.87	4.52	3.12	53.44	7.68

TABLE 14A : FLOAT-SINK CUMULATIVE DATA -48+200 mesh SIEVE FRACTION

ELEMENTARY DATA					CUMULATIVE DATA							
RELATIVE SPECIFIC-GRAVITY					FLOAT				SINK			
FRACTIONS	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	0.09	0	0.71	0	0.09		0.71		100.00		1.30	
1.60-1.80	0.29	0	0.78	0	0.38		0.76		99.91		1.30	
1.80-2.00	1.42	62.84	0.69	5443	1.80		0.71		99.62	82.61	1.30	1026
2.00-2.20	9.98	74.33	0.43	3110	11.78		0.47		98.20	82.90	1.31	962
2.20-2.40	38.85	82.00	1.07	1098	50.63		0.93		88.22	83.87	1.41	719
2.40-2.60	35.80	85.32	0.55	493	86.43		0.77		49.37	85.34	1.67	422
2.60-SINKS	13.57	85.40	4.64	233	100.00		1.30		13.57	85.40	4.64	233

* CORRECTED FOR SULPHUR

TABLE 14B : FLOAT-SINK CUMULATIVE DATA -48+200 mesh SIEVE FRACTION ROCK-EVAL

RELATIVE SPECIFIC-GRAVITY					FLOAT				SINK			
FRACTIONS	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	0.09	20.13	324.32	44.56	0.09	20.13	324.32	44.56	100.00	4.46	50.27	7.33
1.60-1.80	0.29	9.38	285.03	31.05	0.38	11.93	294.34	34.25	99.91	4.44	50.02	7.29
1.80-2.00	1.42	4.00	214.18	23.13	1.80	5.67	231.10	25.48	99.62	4.43	49.34	7.22
2.00-2.20	9.98	5.31	127.15	15.63	11.78	5.37	143.03	17.13	98.20	4.44	46.96	6.99
2.20-2.40	38.85	6.86	58.13	8.56	50.63	6.51	77.88	10.56	88.22	4.34	37.88	6.02
2.40-2.60	35.80	3.14	28.40	4.84	86.43	5.12	57.39	8.19	49.37	2.35	21.95	4.02
2.60-SINKS	13.57	0.27	4.94	1.84	100.00	4.46	50.27	7.33	13.57	0.27	4.94	1.84

TABLE 14C : FLOAT-SINK - CUMULATIVE DATA -48+200 mesh SIEVE FRACTION CARBON,OXYGEN,VOLATILES

ELEMENTARY DATA					CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	0.09	51.57	6.82	@	0.09	51.57	6.82		100.00	8.46	6.14	
1.60-1.80	0.29	35.96	6.00	@	0.38	39.66	6.19		99.91	8.42	6.14	
1.80-2.00	1.42	26.23	5.62	35.73	1.80	29.06	5.74		99.62	8.34	6.14	17.16
2.00-2.20	9.98	16.26	5.16	23.82	11.78	18.22	5.25		98.20	8.08	6.15	16.89
2.20-2.40	38.85	8.83	5.05	17.94	50.63	11.01	5.10		88.22	7.15	6.26	16.10
2.40-2.60	35.80	5.67	5.17	14.68	86.43	8.80	5.13		49.37	5.83	7.21	14.66
2.60-SINKS	13.57	6.27	12.58	14.60	100.00	8.46	6.14		13.57	6.27	12.58	14.60

@ INSUFFICIENT SAMPLE

TABLE 14D : FLOAT-SINK - CUMULATIVE DATA -48+200 mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

ELEMENTARY DATA				CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3	MASS %	CaCO3	MgCO3
FLOAT-1.60	0.09	@	@	0.09			100.00		
1.60-1.80	0.29	@	@	0.38			99.91		
1.80-2.00	1.42	6.62	3.03	1.80			99.62	12.06	3.91
2.00-2.20	9.98	5.94	3.45	11.78			98.20	12.14	3.92
2.20-2.40	38.85	7.57	3.62	50.63			88.22	12.84	3.98
2.40-2.60	35.80	8.89	4.35	86.43			49.37	16.99	4.26
2.60-SINKS	13.57	38.37	4.02	100.00			13.57	38.37	4.02

@ INSUFFICIENT SAMPLE

TABLE 15A : FLOAT-SINK CUMULATIVE DATA -200+400 mesh SIEVE FRACTION

	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH %	SULPHUR %	BTU/lb*	MASS %	ASH%	SULPHUR %	BTU/lb*
FLOAT-1.60	0.06	15.26	@	@	0.06				100.00			
1.60-1.80	0.05	13.48	@	@	0.11				99.94			
1.80-2.00	0.41	7.00	0.53	@	0.52				99.89		1.44	
2.00-2.20	8.99	5.24	0.56	3418	9.51				99.48	81.99	1.44	1352
2.20-2.40	45.83	2.98	1.19	1483	55.34				90.49	82.97	1.53	1147
2.40-2.60	38.71	1.15	0.67	855	94.05				44.66	83.80	1.88	802
2.60-SINKS	5.95	0.37	9.77	454	100.00				5.95	80.44	9.77	454

* CORRECTED FOR SULPHUR

@ INSUFFICIENT SAMPLE

TABLE 15B : FLOAT-SINK CUMULATIVE DATA -200+400 mesh SIEVE FRACTION ROCK-EVAL

					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.	MASS %	S1(mg/g)	S2(mg/g)	T.O.C.
FLOAT-1.60	0.06	15.36	280.97	39.35	0.06	15.36	280.97	39.35	100.00	2.35	41.36	6.03
1.60-1.80	0.05	13.48	269.82	29.31	0.11	14.51	275.90	34.79	99.94	2.34	41.21	6.01
1.80-2.00	0.41	7.00	214.42	24.74	0.52	8.59	227.43	26.87	99.89	2.34	41.10	6.00
2.00-2.20	8.99	5.24	122.29	15.78	9.51	5.42	128.04	16.39	99.48	2.32	40.38	5.92
2.20-2.40	45.83	2.98	48.41	7.10	55.34	3.40	62.09	8.70	90.49	2.03	32.25	4.94
2.40-2.60	38.71	1.15	17.40	2.89	94.05	2.47	43.70	6.31	44.66	1.05	15.66	2.72
2.60-SINKS	5.95	0.37	4.34	1.64	100.00	2.35	41.36	6.03	5.95	0.37	4.34	1.64

TABLE 15C : FLOAT-SINK - CUMULATIVE DATA -200+400 mesh SIEVE FRACTION CARBON,OXYGEN,VOLATILES

	ELEMENTARY DATA				CUMULATIVE DATA							
					FLOAT				SINK			
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	TOTAL CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES	MASS %	CARBON	OXYGEN	VOLATILES
FLOAT-1.60	0.06	40.05	8.88	@	0.06	40.05	8.88		100.00	7.92	6.17	
1.60-1.80	0.05	38.37	6.95	@	0.11	39.29	8.00		99.94	7.90	6.17	
1.80-2.00	0.41	26.65	3.67	@	0.52	29.32	4.59		99.89	7.88	6.17	
2.00-2.20	8.99	18.64	4.94	26.57	9.51	19.22	4.92		99.48	7.80	6.18	17.85
2.20-2.40	45.83	7.94	5.50	17.75	55.34	9.88	5.40		90.49	6.73	6.30	16.98
2.40-2.60	38.71	5.43	6.55	15.68	94.05	8.05	5.87		44.66	5.48	7.13	16.20
2.60-SINKS	5.95	5.84	10.88	19.56	100.00	7.92	6.17		5.95	5.84	10.88	19.56

@ INSUFFICIENT SAMPLE

TABLE 15D : FLOAT-SINK - CUMULATIVE DATA -200+400 mesh SIEVE FRACTION CALCIUM CARBONATE,MAGNESIUM CARBONATE

	ELEMENTARY DATA			CUMULATIVE DATA					
				FLOAT			SINK		
RELATIVE SPECIFIC-GRAVITY FRACTIONS	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$	MASS %	$CaCO_3$	$MgCO_3$
FLOAT-1.60	0.06	@	@	0.06			100.00		
1.60-1.80	0.05	@	@	0.11			99.94		
1.80-2.00	0.41	@	@	0.52			99.89		
2.00-2.20	8.99	5.74	3.35	9.51			99.48	13.20	3.69
2.20-2.40	45.83	8.74	3.52	55.34			90.49	13.94	3.73
2.40-2.60	38.71	17.48	3.81	94.05			44.66	19.28	3.94
2.60-SINKS	5.95	30.96	4.79	100.00			5.95	31.00	4.79

@ INSUFFICIENT SAMPLE

TABLE 16 : ORGANIC AND CARBONATE RECOVERIES - FLOAT-SINK ANALYSIS

SIEVE FRACTION	WT. PERCENT	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
+2"					
FLOAT-1.60	#				
1.60-1.80	#				
1.80-2.00	10.52	16.88	19.90	7.08	8.36
2.00-2.20	45.29	51.37	52.20	50.96	53.67
2.20-2.40	40.34	32.59	35.15	39.03	35.73
2.40-2.60	3.85	0.92	1.60	21.31	0.80
2.60-SINKS	#				
-2" +1"					
FLOAT-1.60	0.77	0.89	0.90	0.24	0.42
1.60-1.80	1.27	1.93	2.15	0.51	0.71
1.80-2.00	15.01	23.29	26.48	17.78	11.55
2.00-2.20	50.44	56.88	61.09	47.95	47.39
2.20-2.40	32.51	26.48	14.43	36.12	55.46
2.40-2.60	#				
2.60-SINKS	#				
-1" +1/2"					
FLOAT-1.60	1.10	2.21	2.68	0.58	0.62
1.60-1.80	9.99	16.07	17.97	6.18	5.31
1.80-2.00	21.15	28.10	30.40	15.26	13.08
2.00-2.20	36.12	39.49	40.93	36.58	29.87
2.20-2.40	27.50	21.00	21.02	23.94	29.03
2.40-2.60	3.73	0.80	1.90	19.25	3.13
2.60-SINKS	0.41	0.06	0.11		
-1/2" +4m					
FLOAT-1.60	2.48	4.91	5.85	0.76	1.25
1.60-1.80	8.59	14.82	16.84	4.31	4.98
1.80-2.00	24.29	30.71	31.95	13.26	14.94
2.00-2.20	36.67	36.95	35.35	35.05	29.15
2.20-2.40	25.16	17.87	20.04	31.30	28.84
2.40-2.60	2.54	0.74	0.43	10.15	4.03
2.60-SINKS	0.27	0.04			

NO SAMPLE

TABLE 16 : ORGANIC AND CARBONATE RECOVERIES - FLOAT-SINK ANALYSIS

SIEVE FRACTION	WT. PERCENT	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
-4m +10m					
FLOAT-1.60	1.04	2.34	2.74	0.31	0.46
1.60-1.80	9.43	15.52	16.86	3.54	5.01
1.80-2.00	19.32	25.05	25.90	9.60	11.49
2.00-2.20	43.08	41.93	38.08	28.19	31.06
2.20-2.40	22.48	16.39	9.77	22.15	25.77
2.40-2.60	3.82	1.55	1.00	11.22	7.27
2.60-SINKS	0.83	0.22	0.14		
-10m +48m					
FLOAT-1.60	0.98	2.06	2.63	0.37	0.45
1.60-1.80	1.91	3.56	4.30	0.89	1.03
1.80-2.00	10.73	15.28	17.79	4.76	6.22
2.00-2.20	34.96	35.12	34.17	14.41	21.03
2.20-2.40	34.1	23.39	20.39	19.89	26.36
2.40-2.60	14.2	6.81	9.65	18.91	16.78
2.60-SINKS	3.12	0.68	1.70	12.07	4.03
-48m +200m					
FLOAT-1.60	0.09	0.45			
1.60-1.80	0.29	1.00			
1.80-2.00	0.42	1.08	1.20	0.20	0.21
2.00-2.20	9.98	17.31	16.22	4.30	5.79
2.20-2.40	38.85	36.91	22.30	21.31	23.64
2.40-2.60	35.8	19.23	9.23	23.06	26.17
2.60-SINKS	13.57	2.77	1.65	37.73	9.17
-200m +400m					
FLOAT-1.60	0.06	0.26			
1.60-1.80	0.05	0.16			
1.80-2.00	0.41	1.13			
2.00-2.20	8.99	15.74	16.06	3.69	5.06
2.20-2.40	45.83	36.11	35.53	28.76	27.11
2.40-2.60	38.71	12.42	17.30	49.12	24.79
2.60-SINKS	5.95	1.08	1.41	13.31	4.79

Figure 1.

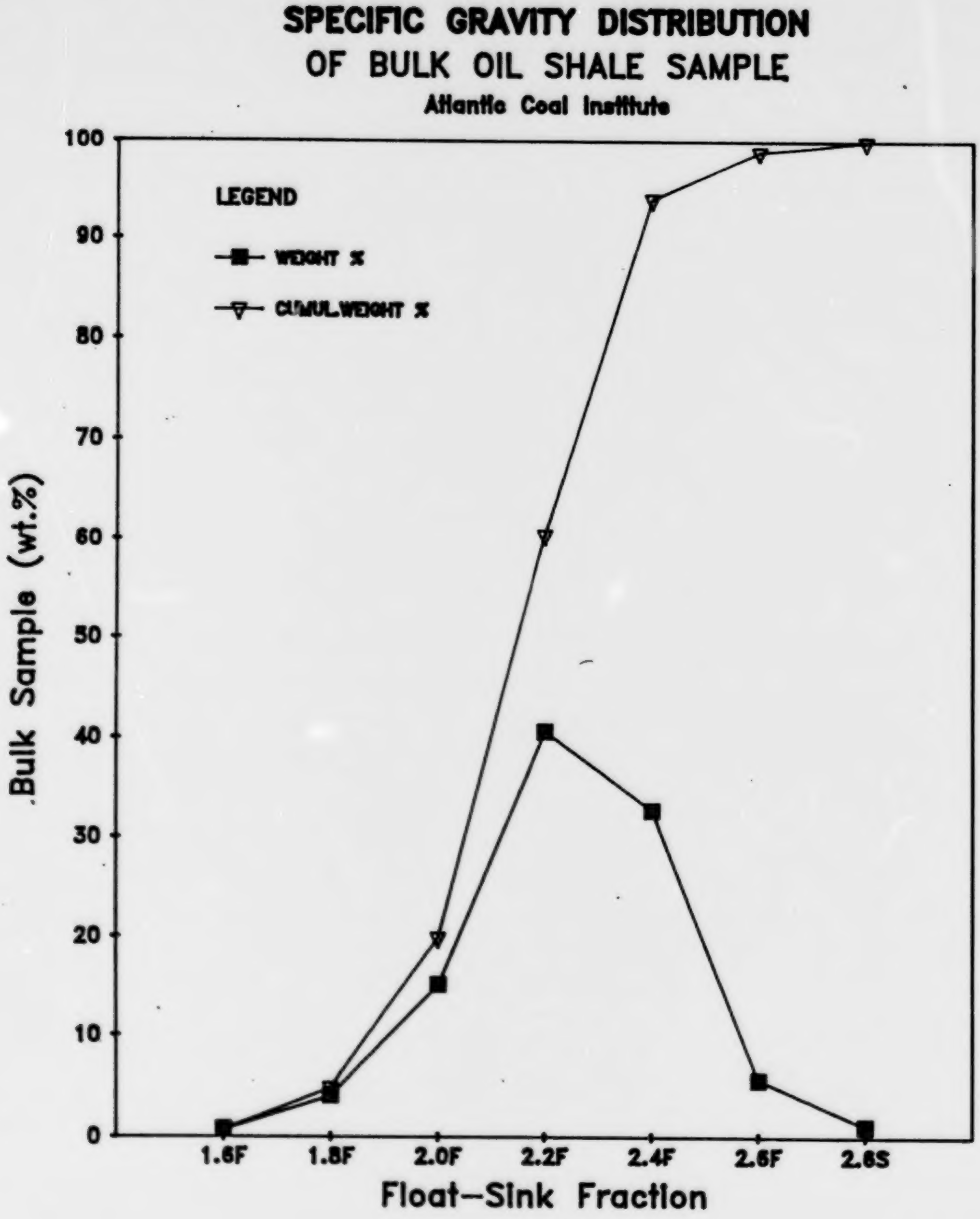

SPECIFIC GRAVITY DISTRIBUTION
OF BULK OIL SHALE SAMPLE
Atlantic Coal Institute
LEGEND
WEIGHT %
CUMUL.WEIGHT %
Bulk Sample (wt.%)
100
90
80
70
60
50
40
30
20
10
0
1.6F
1.8F
2.0F
2.2F
2.4F
2.6F
2.6S
Float-Sink Fraction

Figure 2.

FLOAT – SINK ANALYSIS

Total Carbon verses Organic Carbon

Atlantic Coal Institute

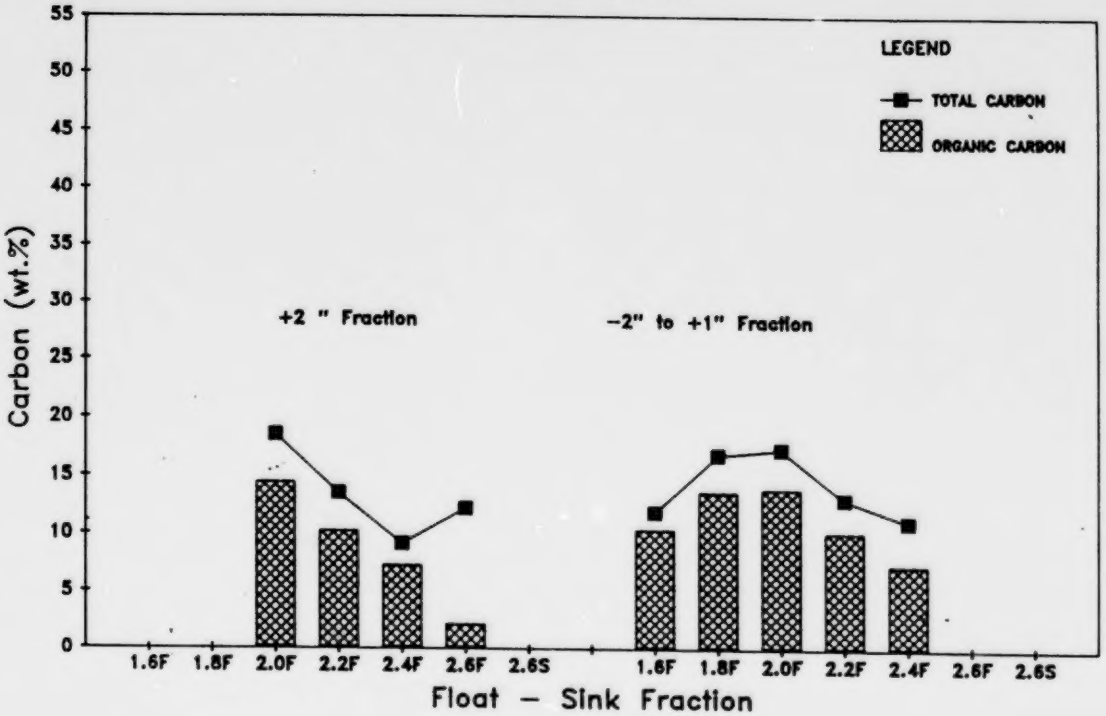


Figure 3.

FLOAT – SINK ANALYSIS

Total Carbon verses Organic Carbon

Atlantic Coal Institute

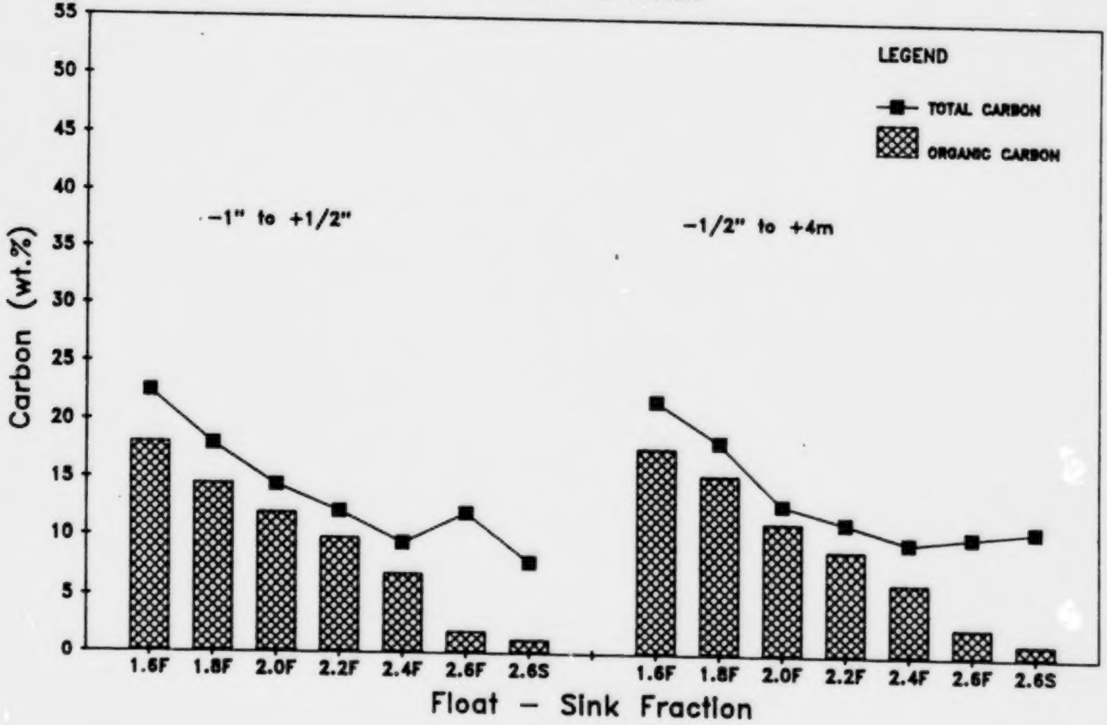


Figure 4.

FLOAT – SINK ANALYSIS
Total Carbon verses Organic Carbon
Atlantic Coal Institute

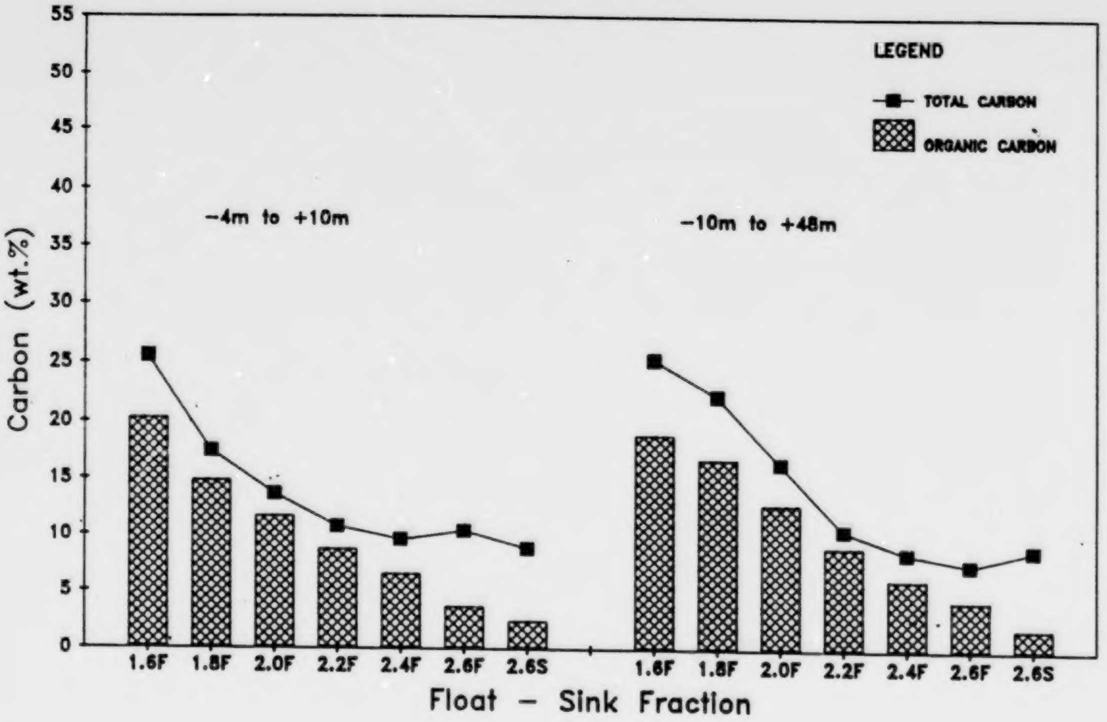


Figure 5.

FLOAT – SINK ANALYSIS
Total Carbon verses Organic Carbon
Atlantic Coal Institute

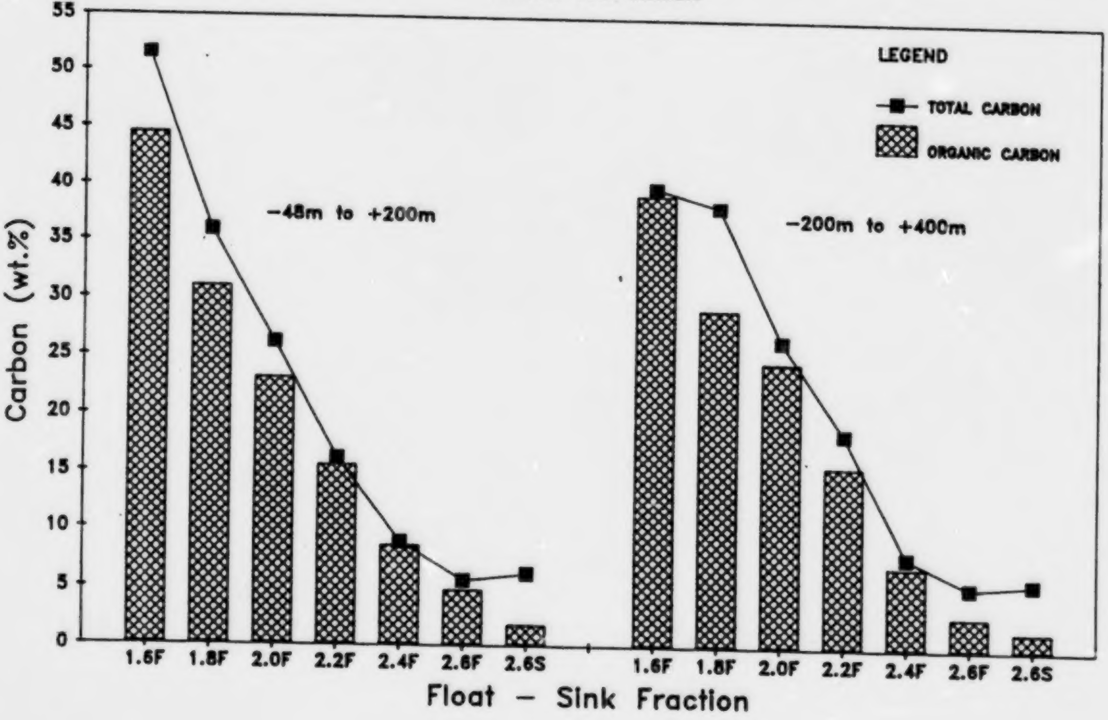


Figure 6.

FLOAT – SINK ANALYSIS

Calorific Value vs S1 + S2

Atlantic Coal Institute

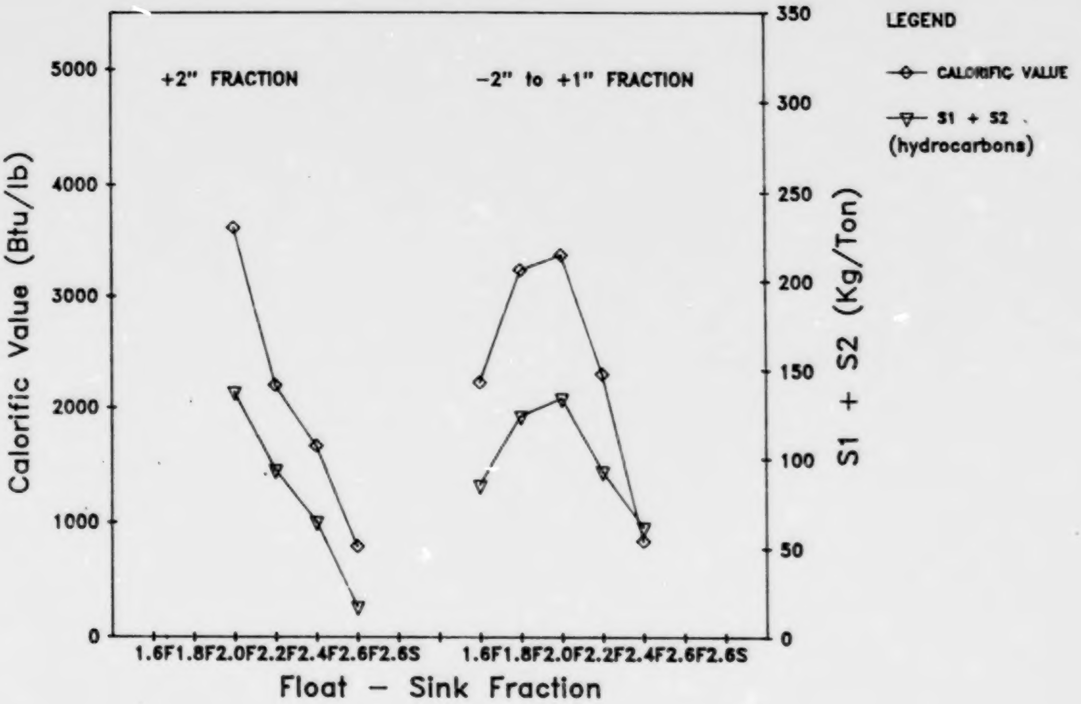


Figure 7.

FLOAT – SINK ANALYSIS

Calorific Value vs S1 + S2

Atlantic Coal Institute

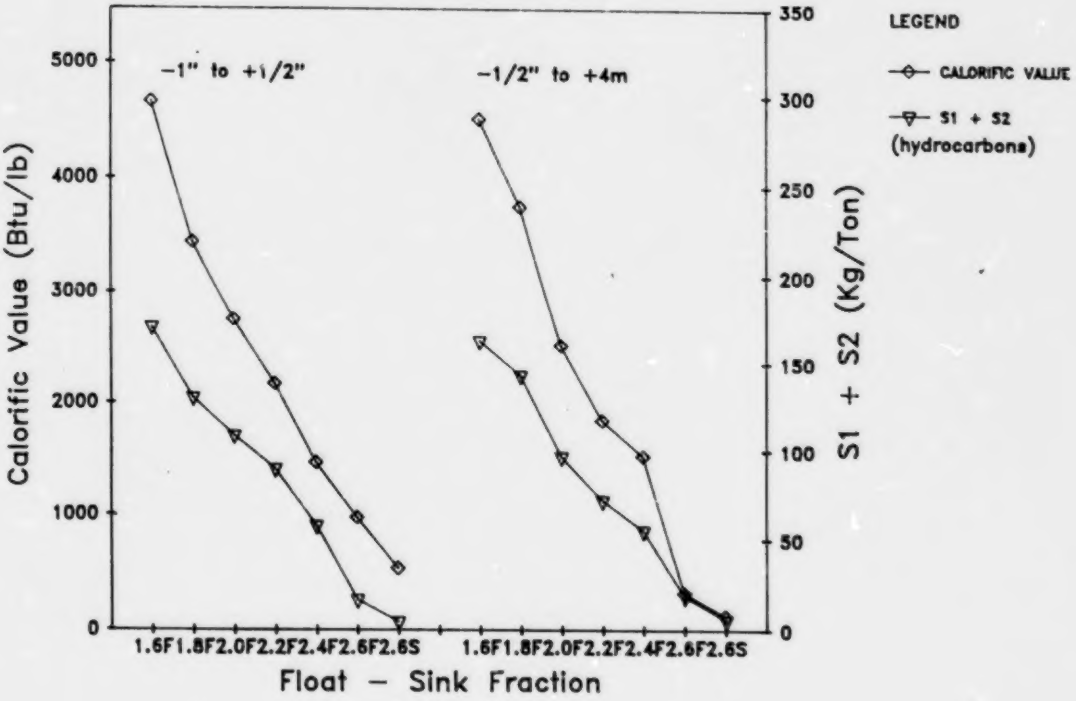


Figure 8.

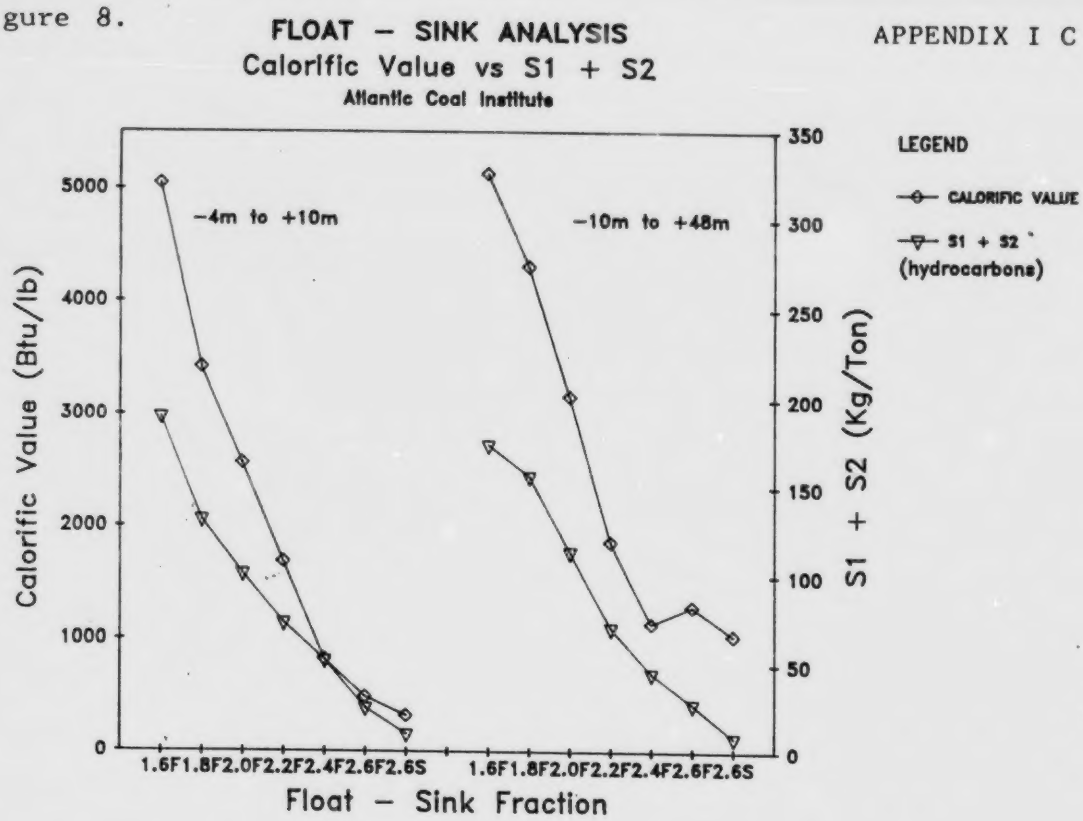


Figure 9.

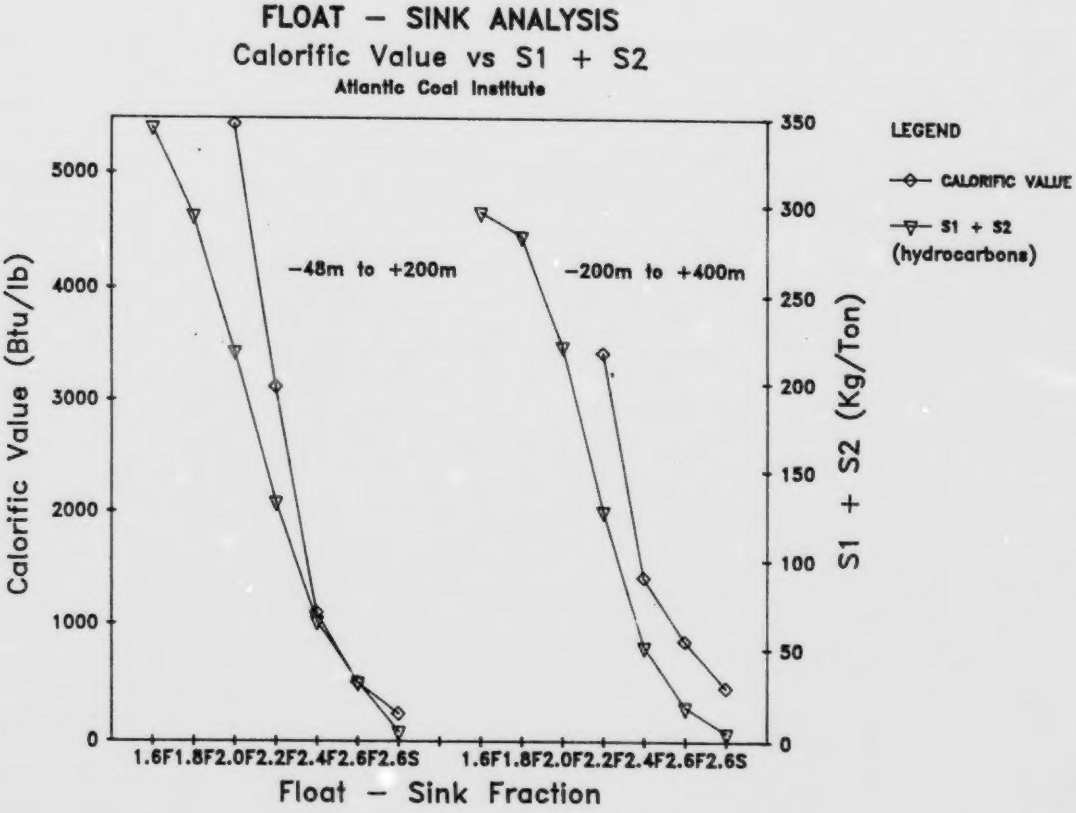


Figure 10.

FLOAT – SINK ANALYSIS

Carbon – Oxygen – Volatiles

Atlantic Coal Institute

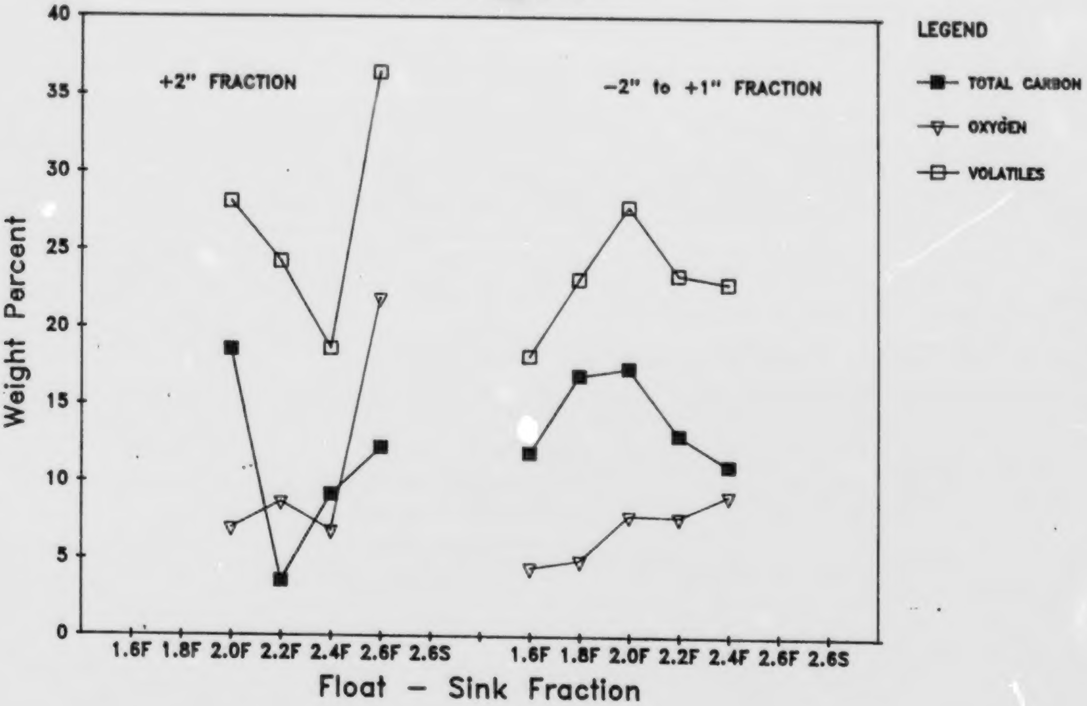


Figure 11.

FLOAT – SINK ANALYSIS

Carbon – Oxygen – Volatiles

Atlantic Coal Institute

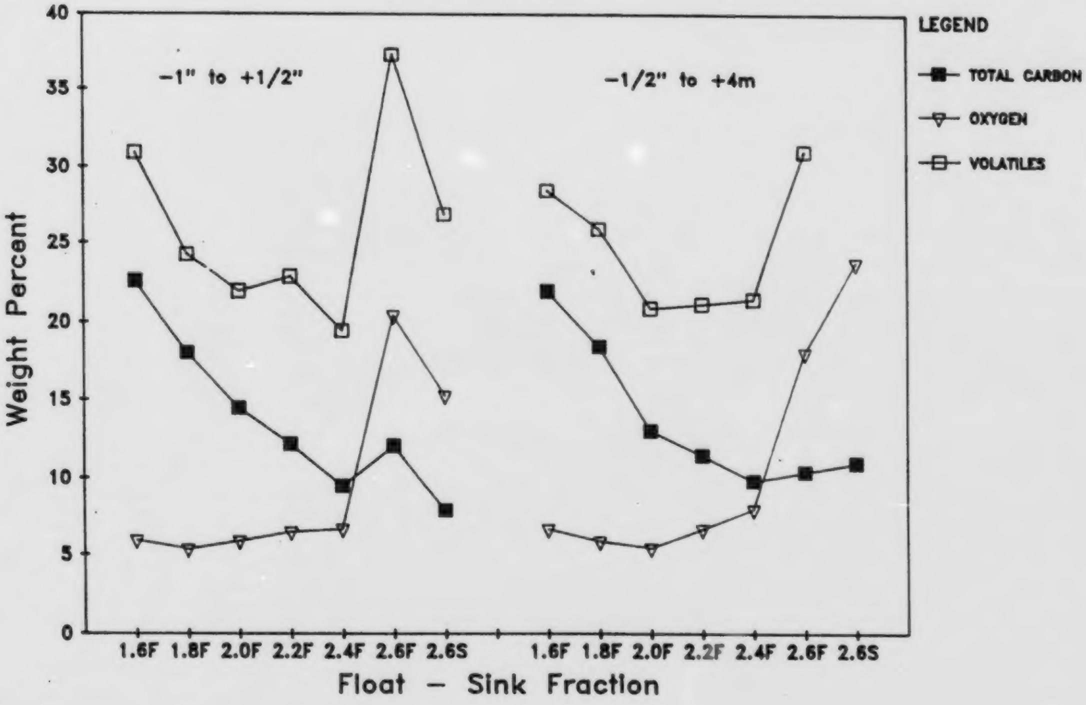


Figure 12.

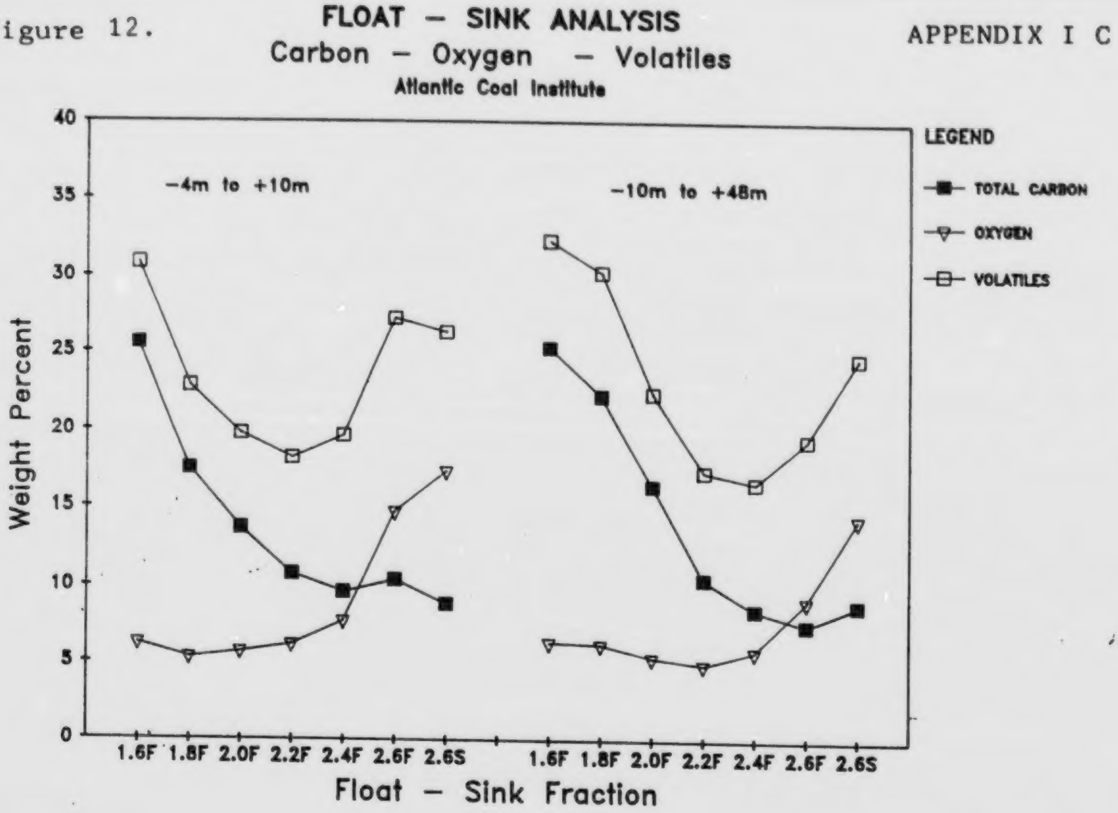


Figure 13.

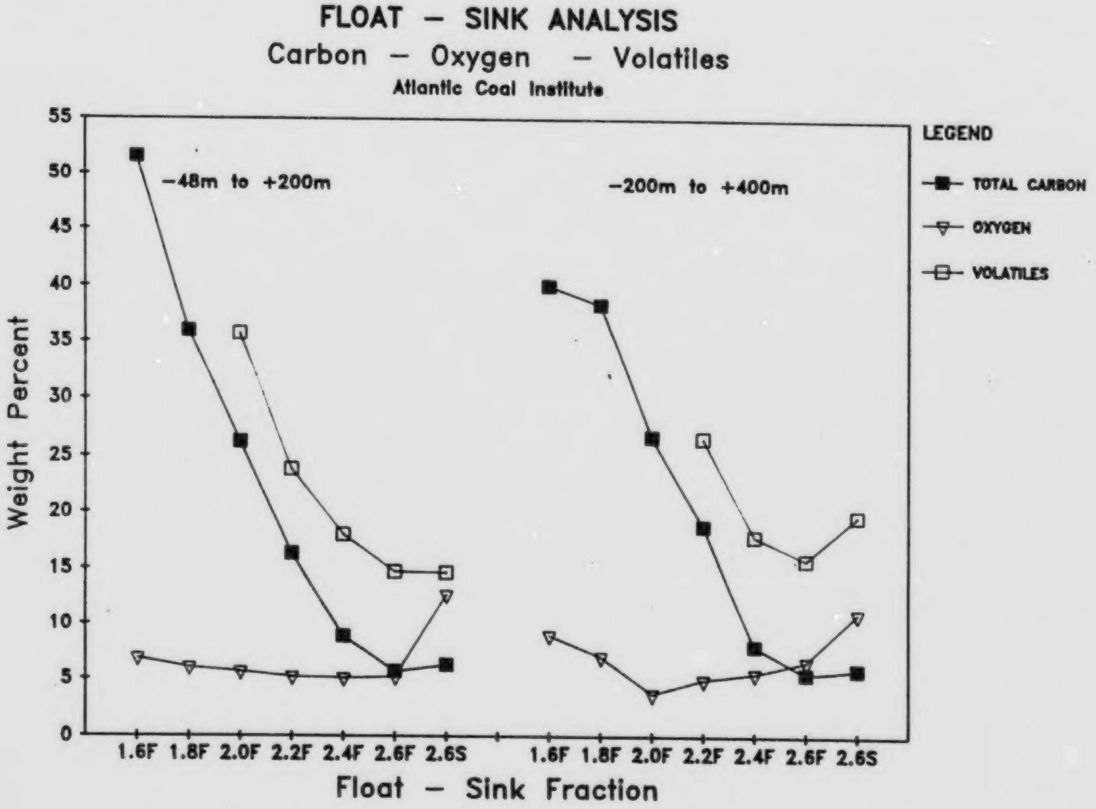


Figure 14

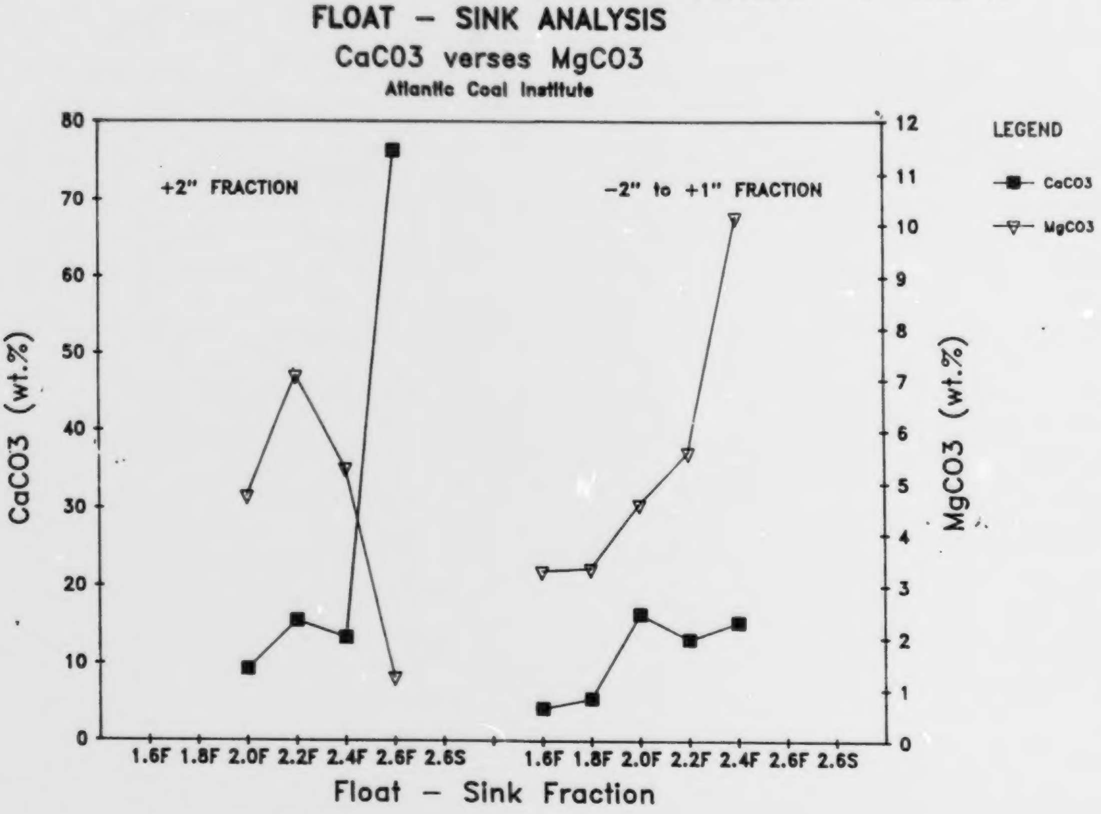


Figure 15

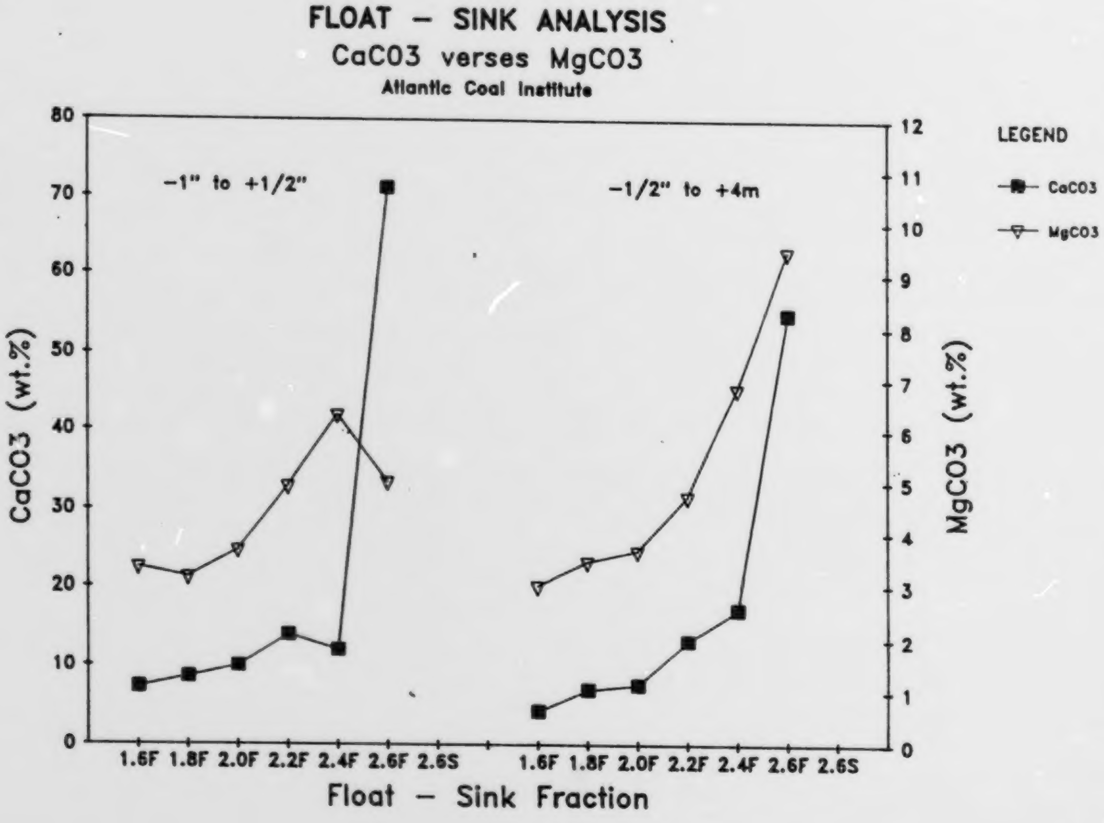


Figure 16

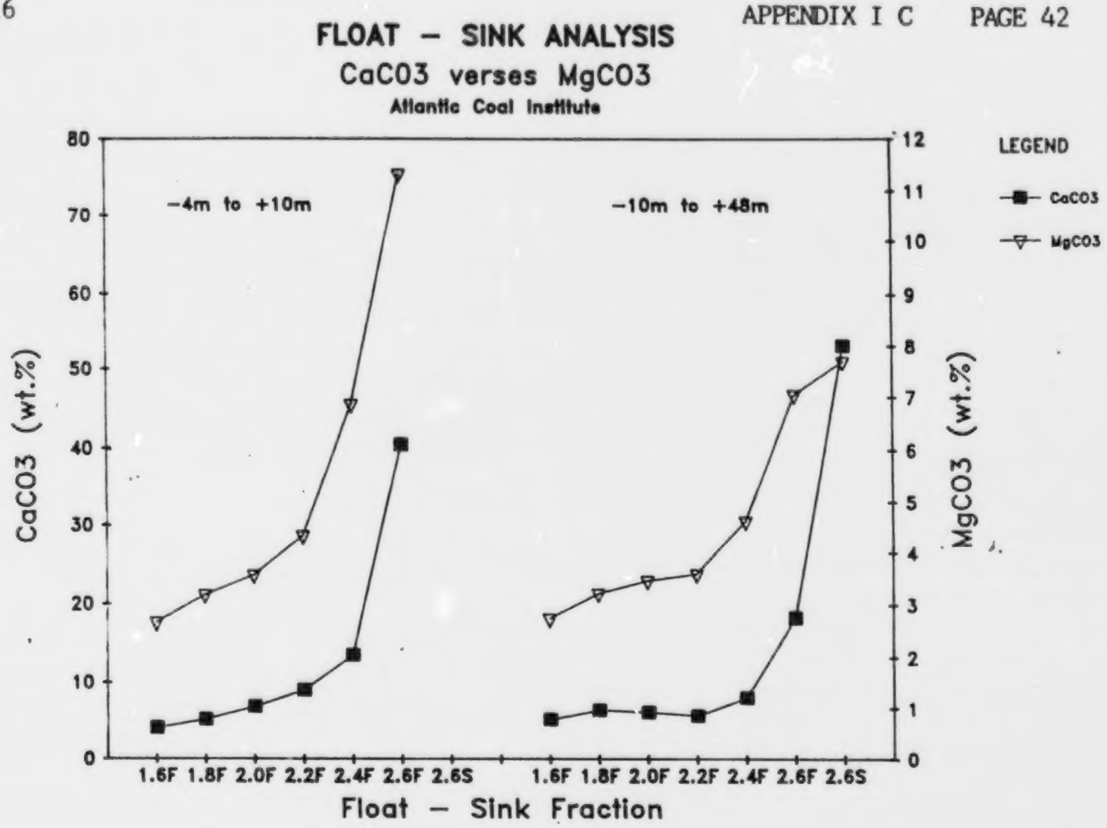


Figure 17

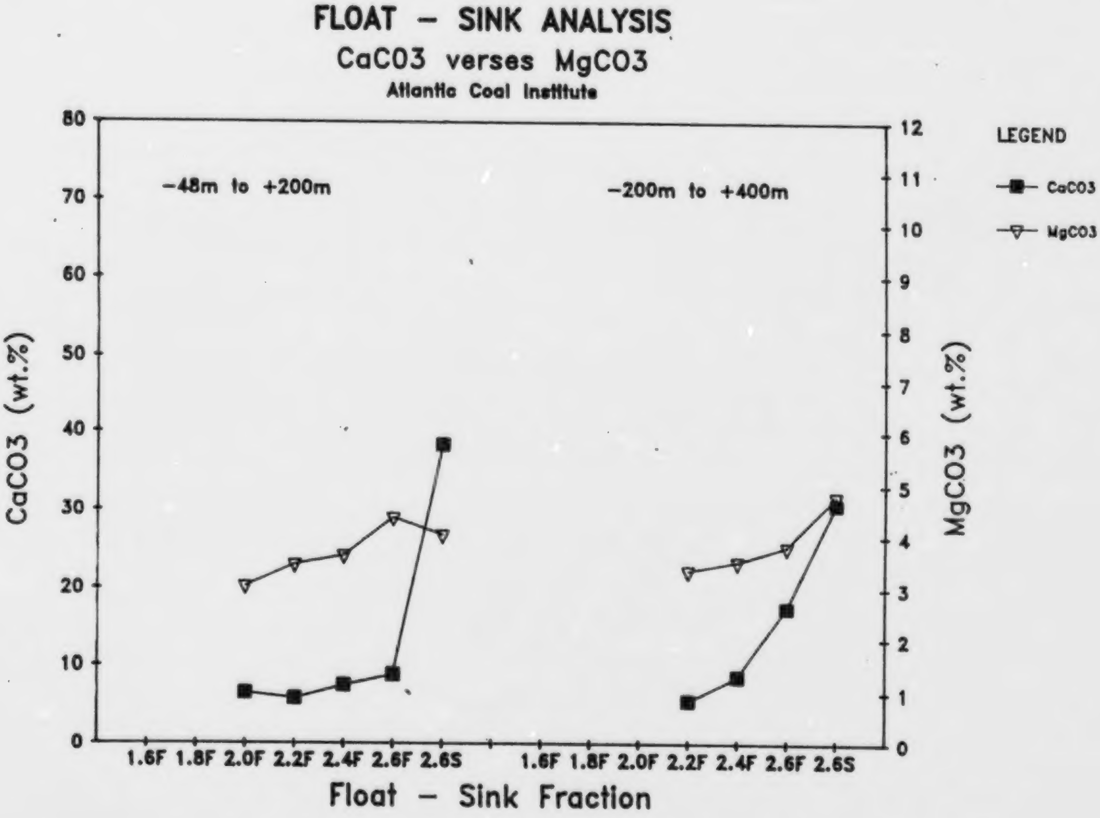


Figure 18

FLOAT–SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

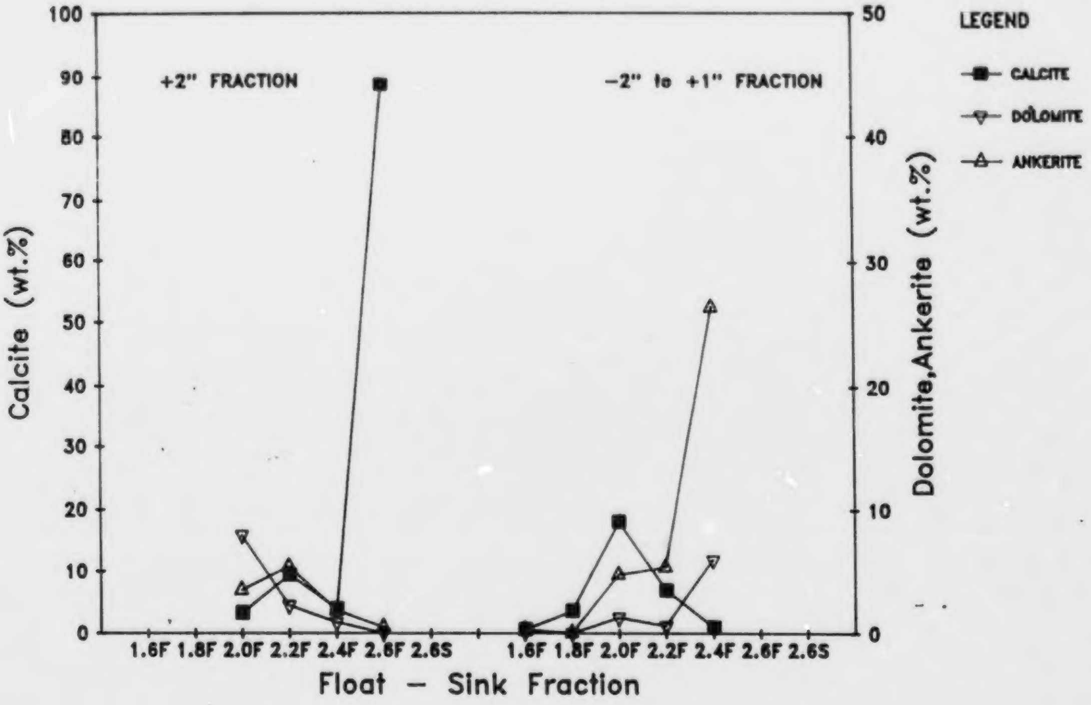


Figure 19

FLOAT–SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

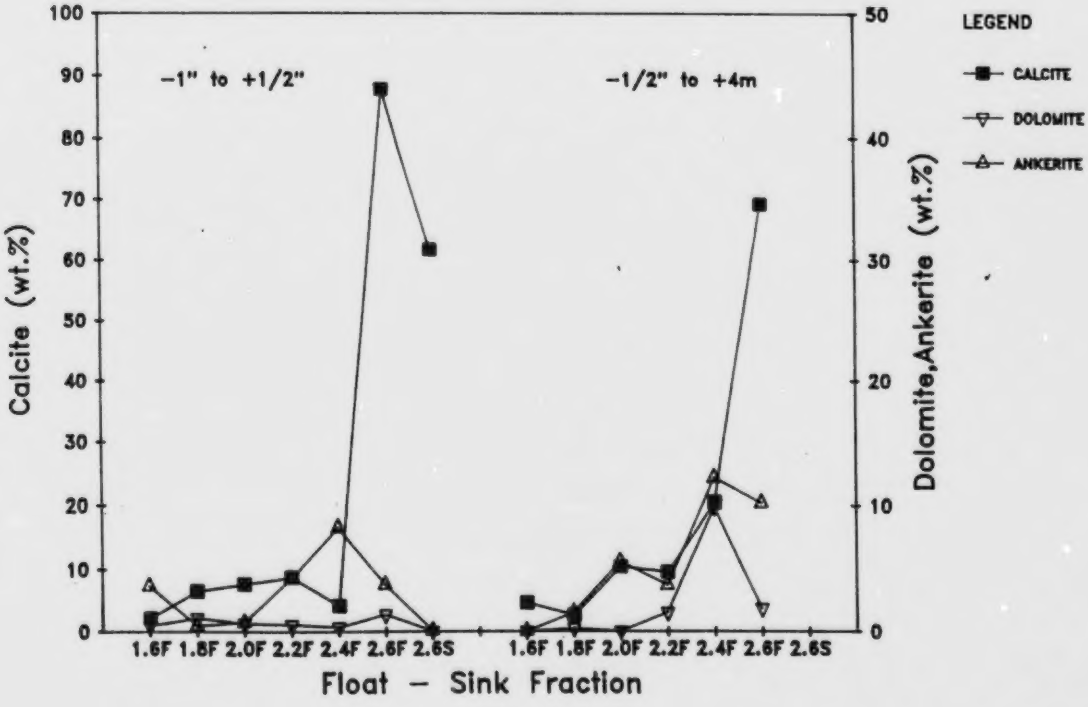


Figure 20

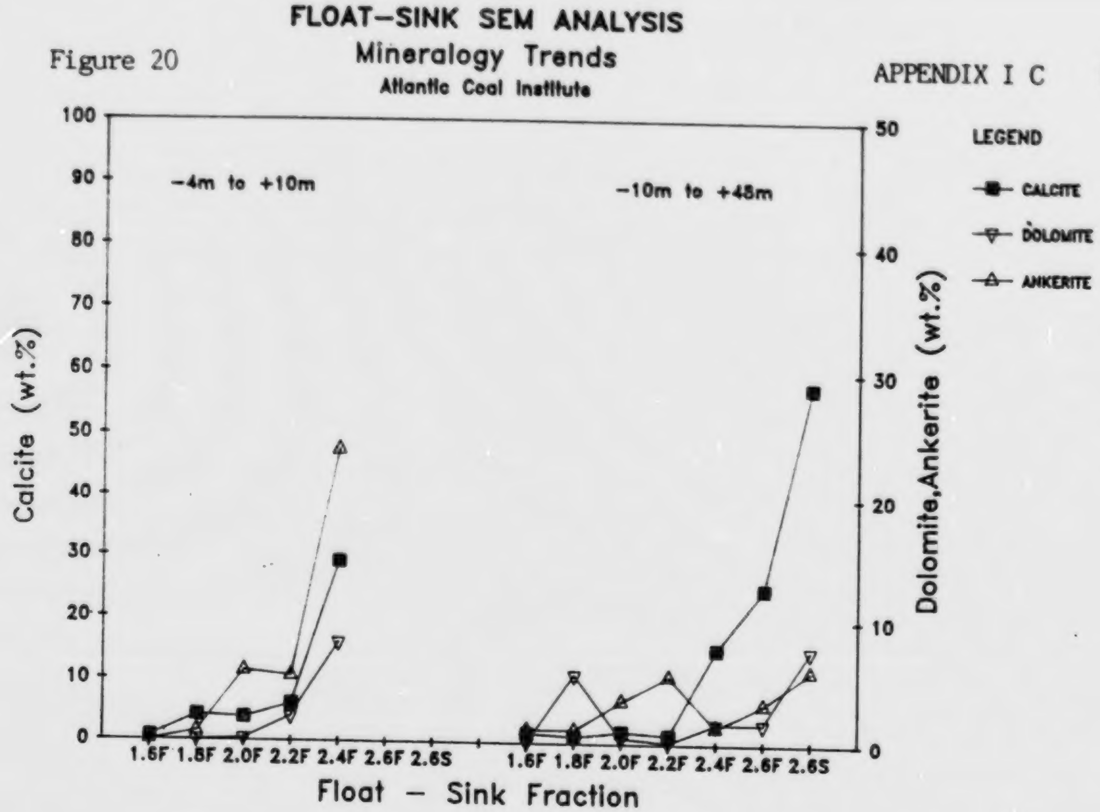


Figure 21

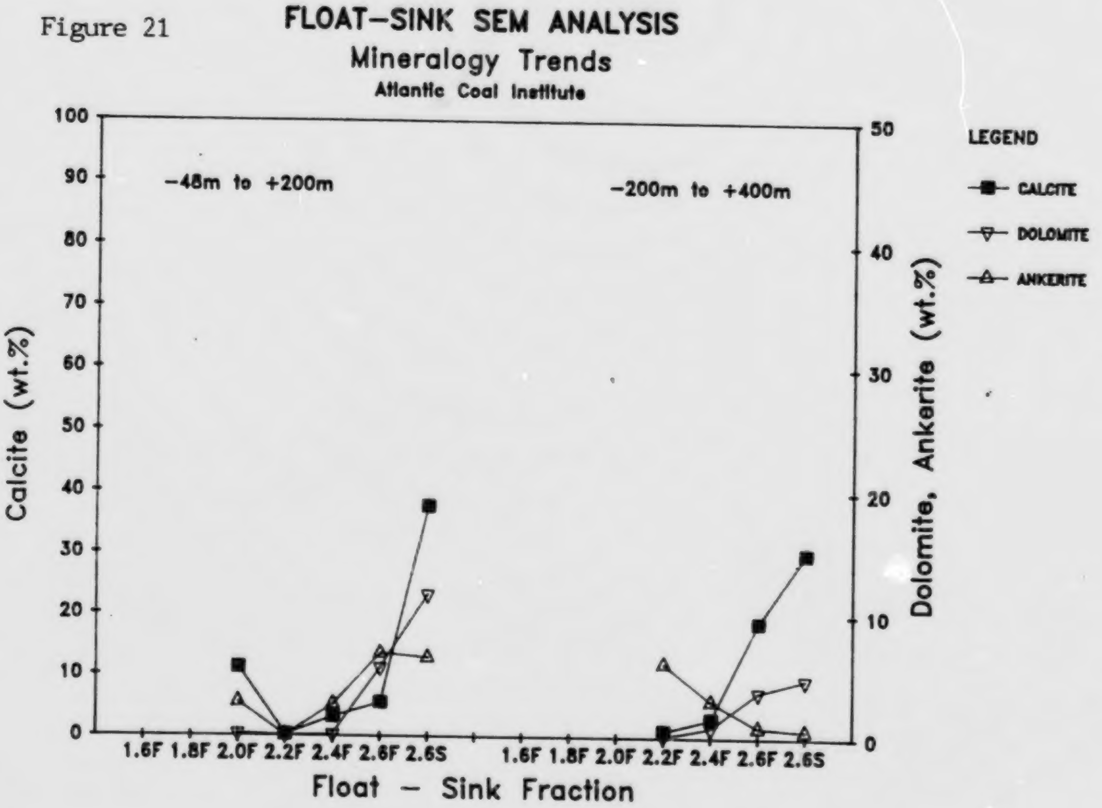


Figure 22

FLOAT – SINK ANALYSIS
Ash vs SiO2 vs Al2O3
Atlantic Coal Institute

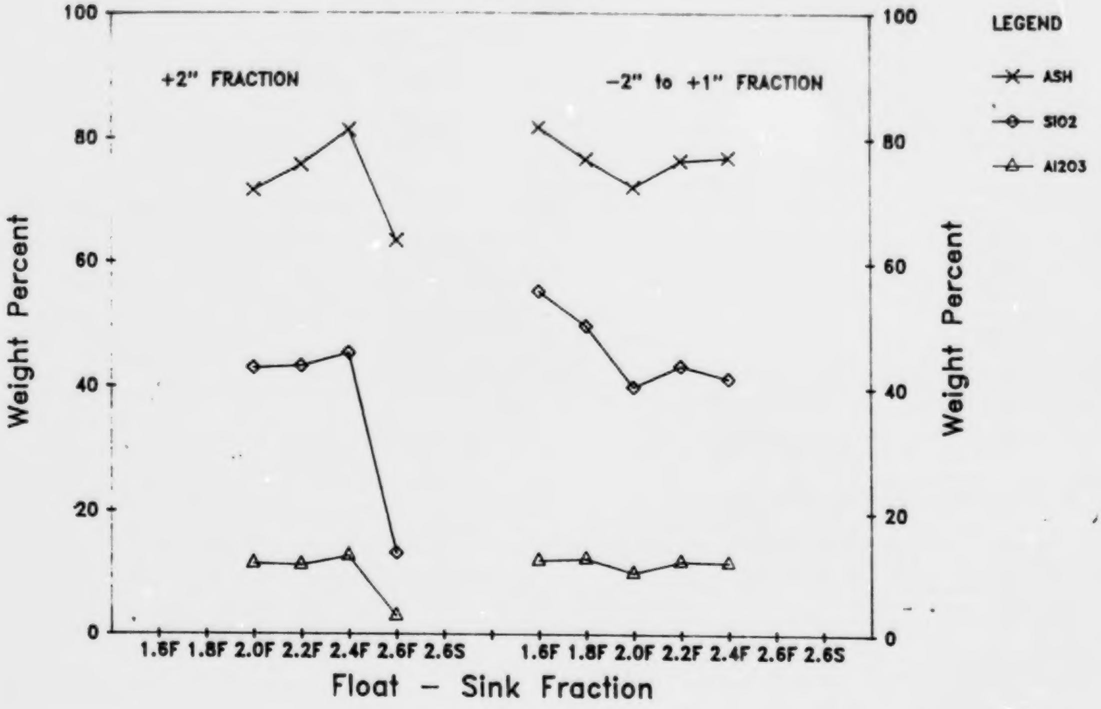


Figure 23

FLOAT – SINK ANALYSIS
Ash vs SiO2 vs Al2O3
Atlantic Coal Institute

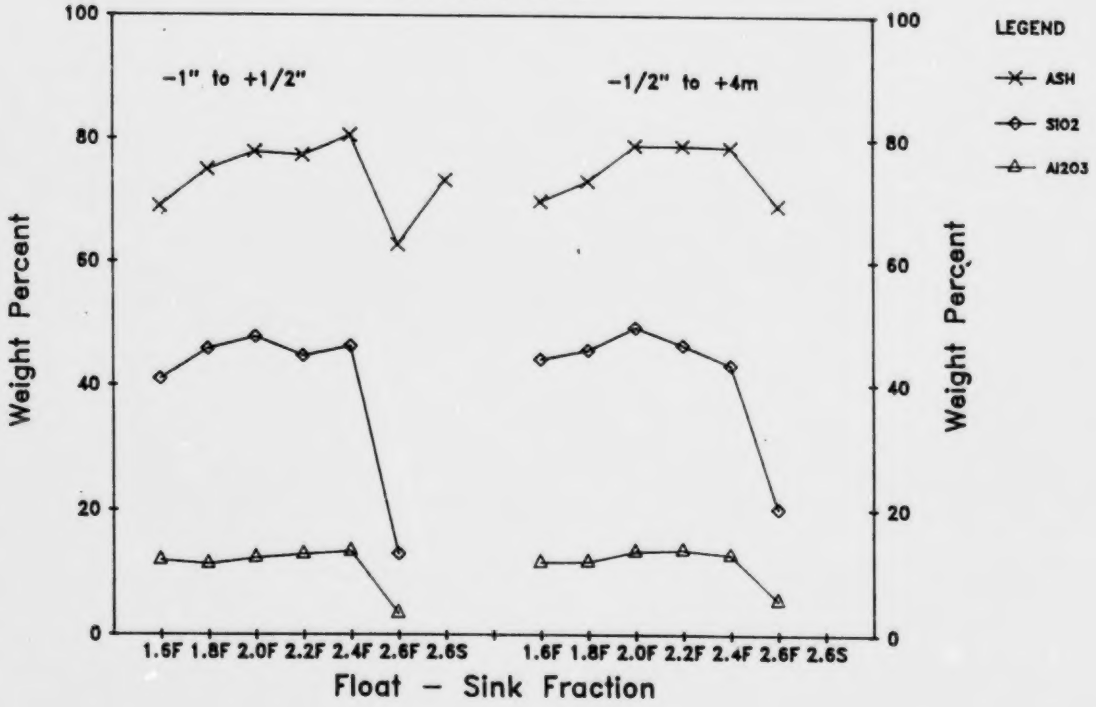


Figure 24

FLOAT – SINK ANALYSIS
Ash vs SiO2 vs Al2O3
Atlantic Coal Institute

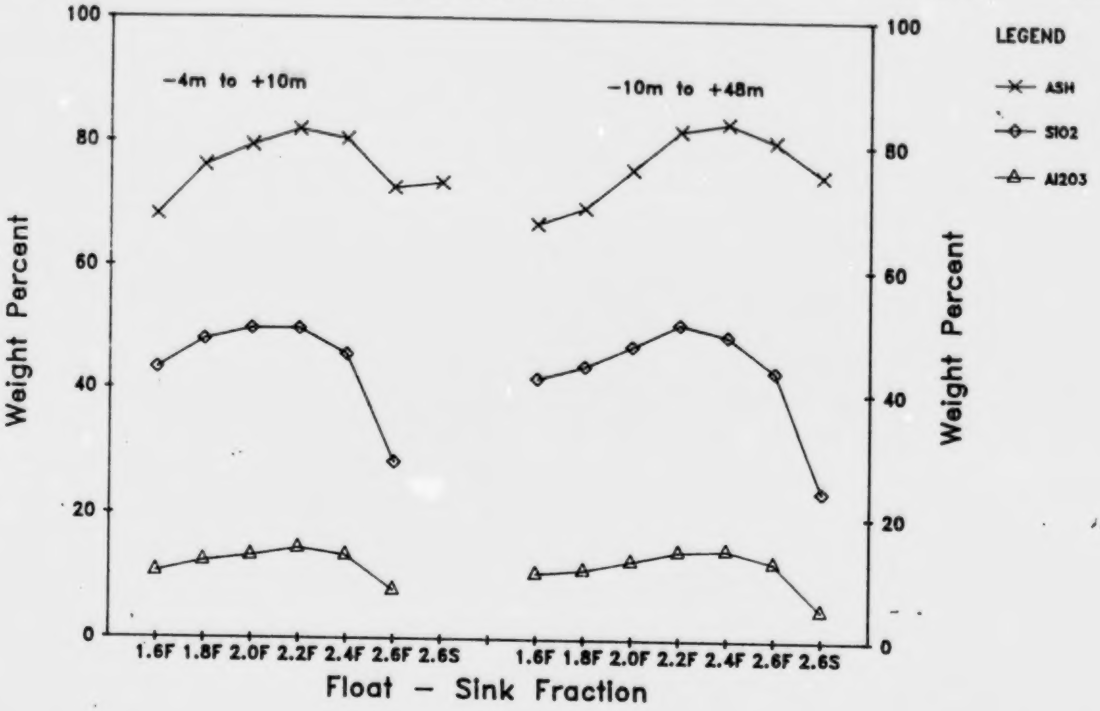


Figure 25

FLOAT – SINK ANALYSIS
Ash vs SiO2 vs Al2O3
Atlantic Coal Institute

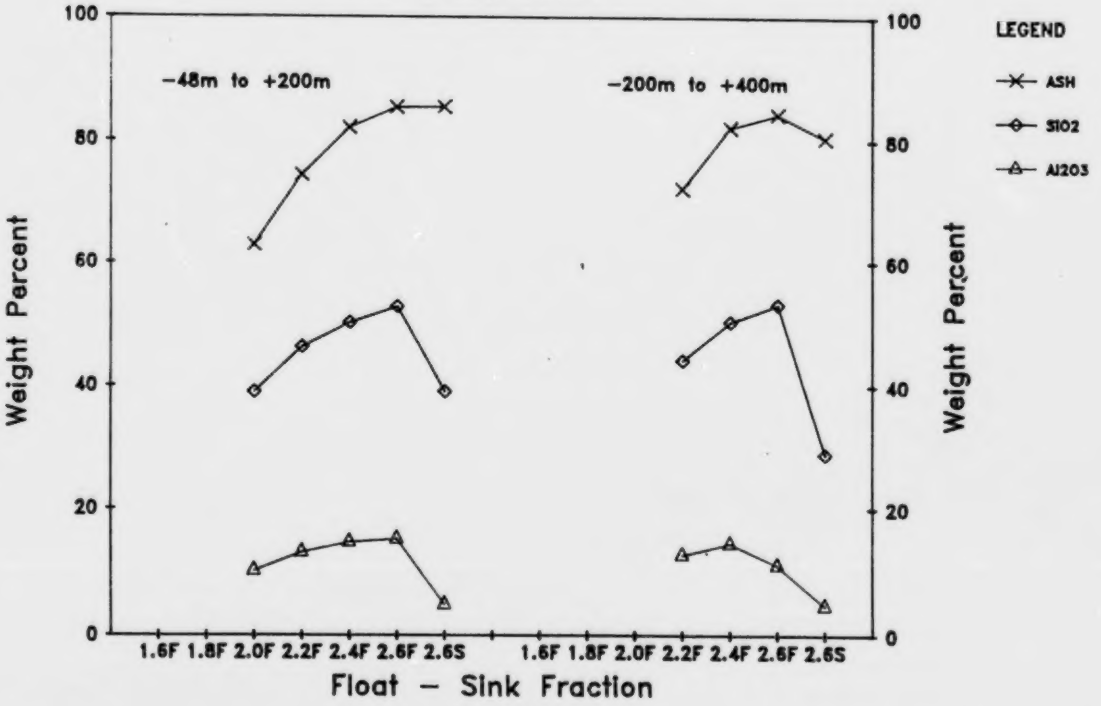


Figure 26

FLOAT-SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

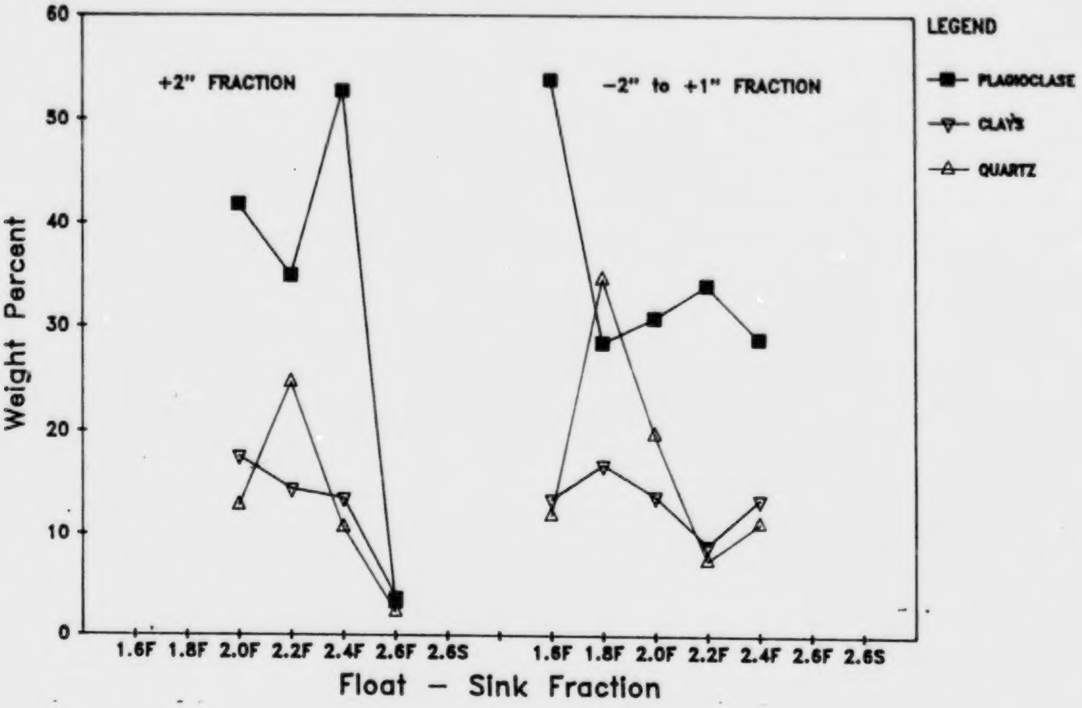


Figure 27

FLOAT-SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

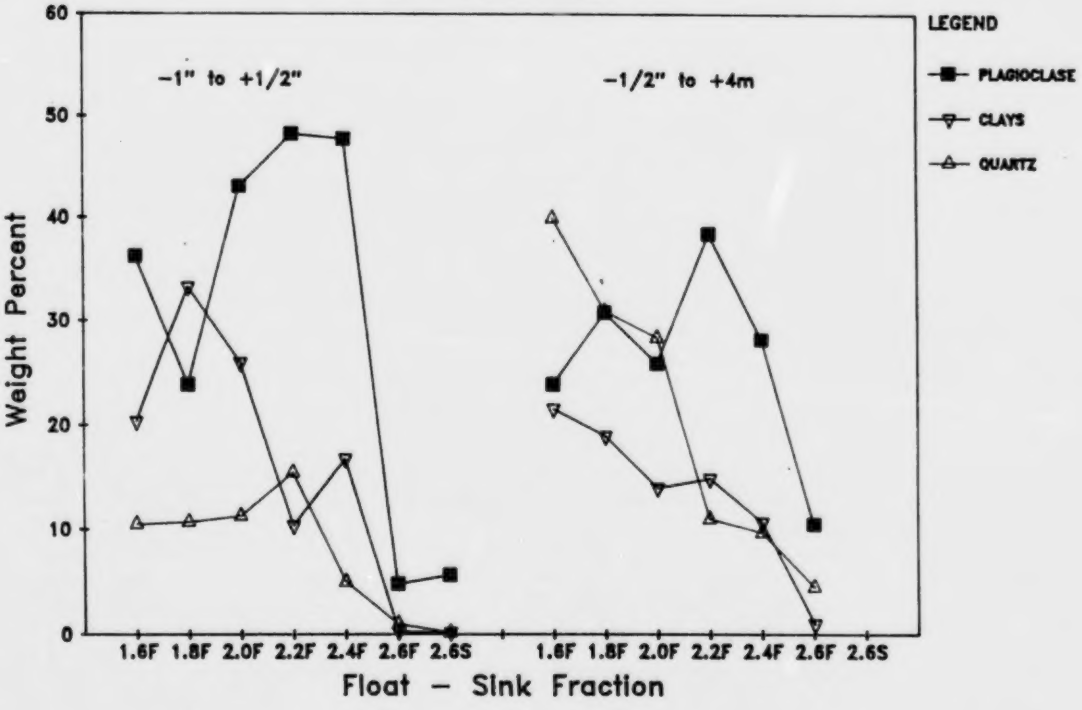


Figure 28

FLOAT-SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

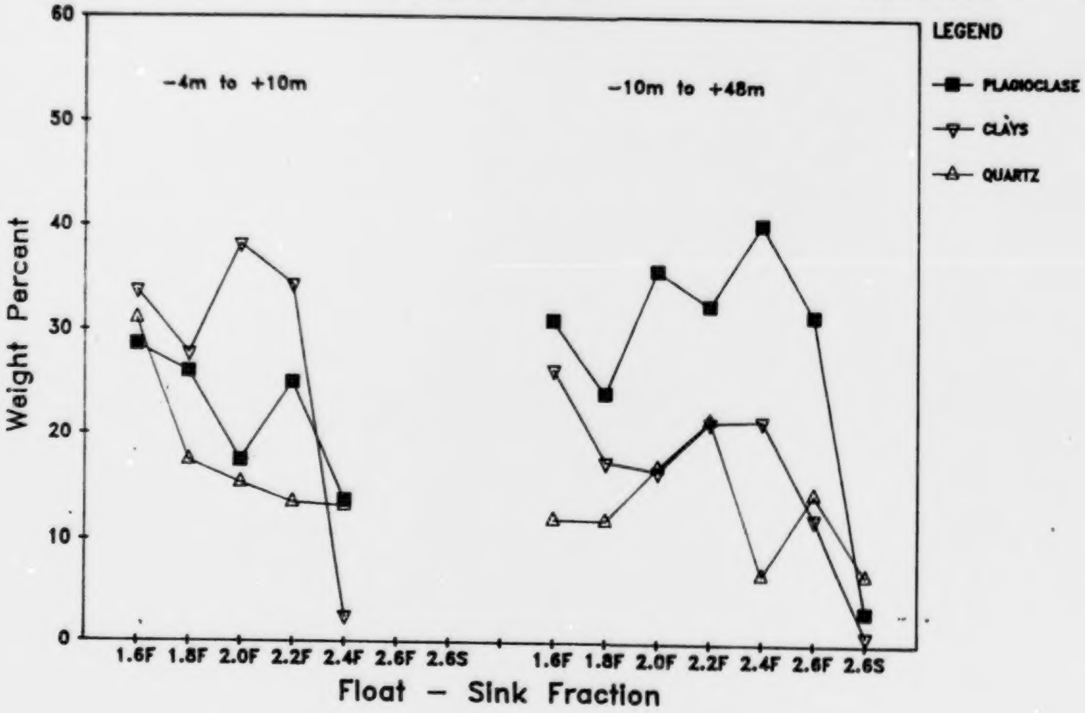


Figure 29

FLOAT-SINK SEM ANALYSIS
Mineralogy Trends
Atlantic Coal Institute

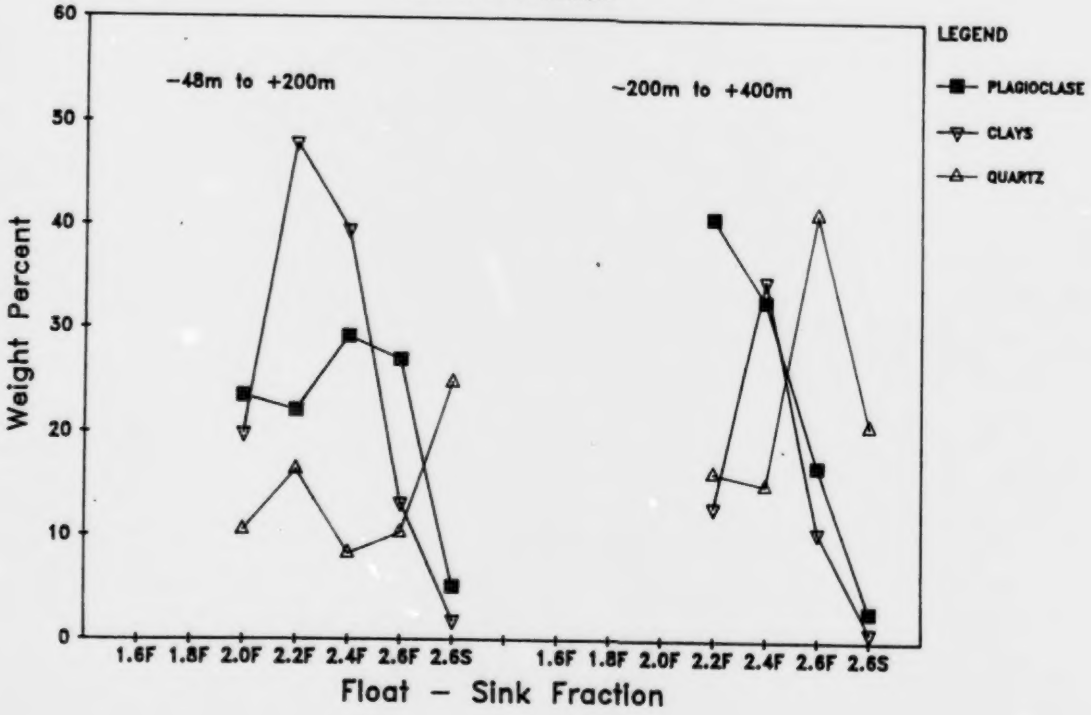
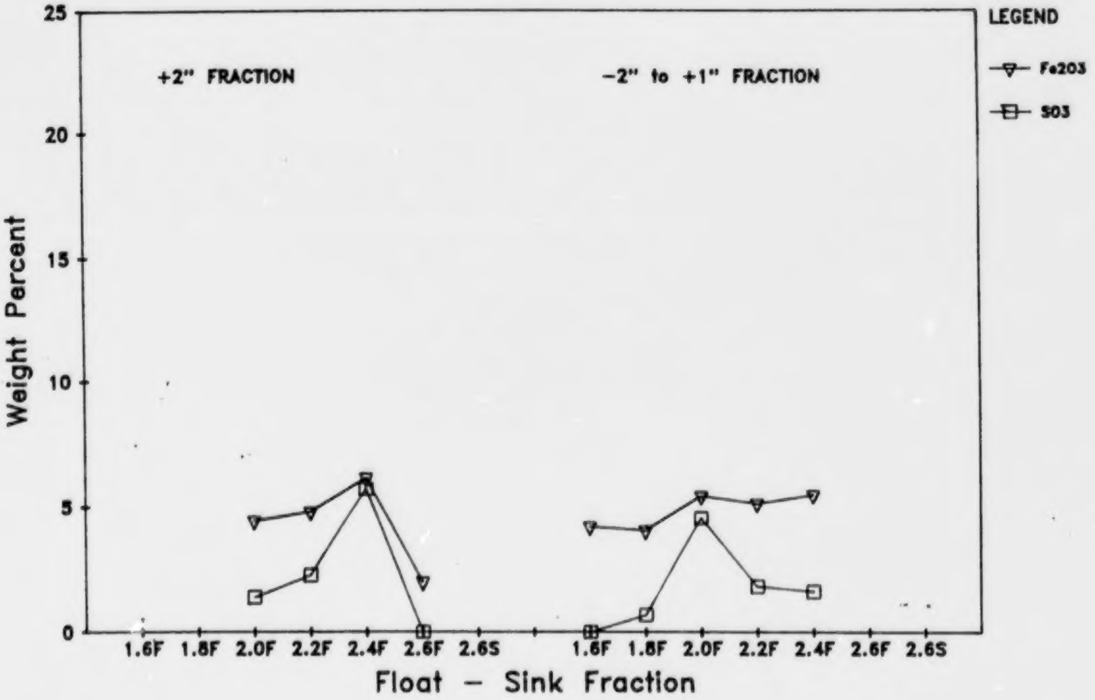
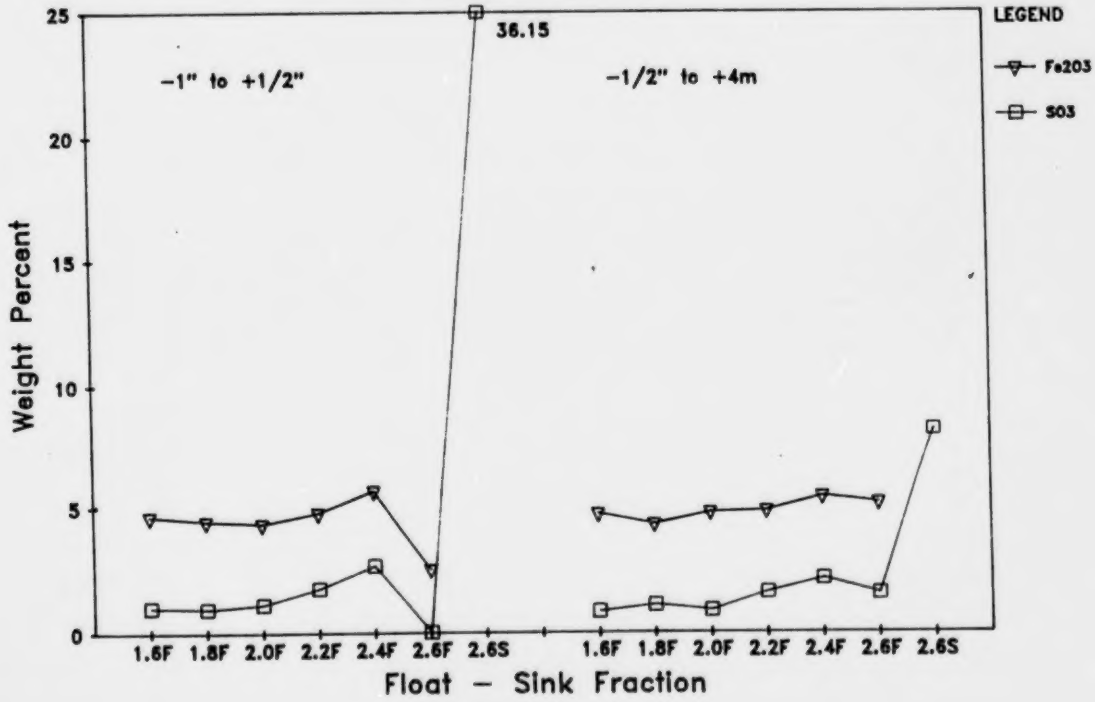


Figure 30



FLOAT - SINK ANALYSIS
Fe2O3 verses SO3
Atlantic Coal Institute

Figure 31



FLOAT - SINK ANALYSIS
Fe2O3 verses SO3
Atlantic Coal Institute

Figure 32

FLOAT – SINK ANALYSIS
Fe2O3 verses SO3
Atlantic Coal Institute

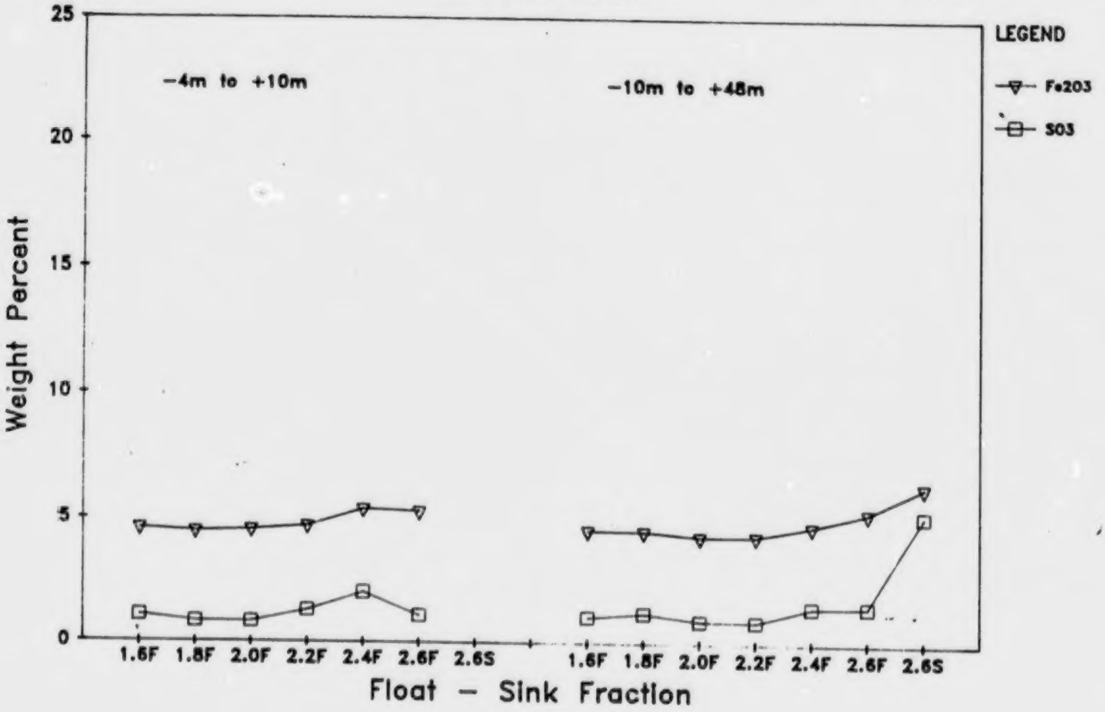
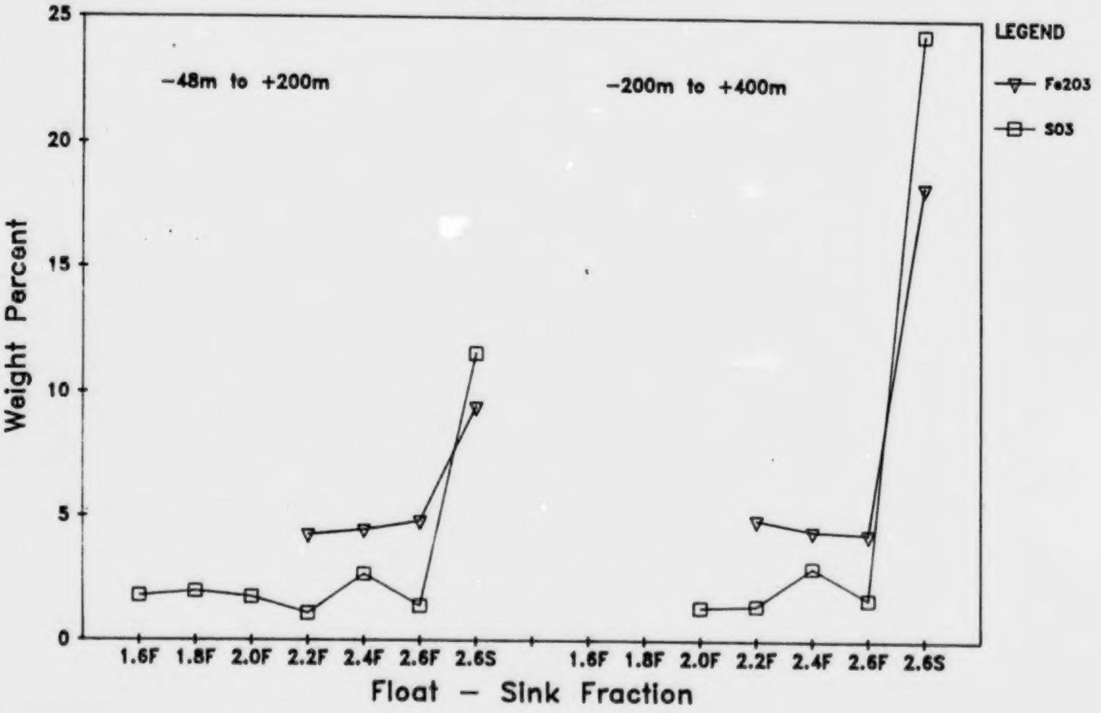


Figure 33

FLOAT – SINK ANALYSIS
Fe2O3 verses SO3
Atlantic Coal Institute



APPENDIX I

ANALYTICAL DATA

D. Concentrating Table

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TABLE 1 : CONCENTRATING TABLE PARAMETERS AND RECOVERIES

TEST #	PULP DENSITY (%solids)	LONGITUDINAL TILT (deg.)	TRANSVERSE TILT (deg.)	WATER FLOW RATE (l/min)	STROKE LENGTH (mm)	CONCENTRATE (wt.%)	TAILS (wt.%)
1	25	0	5	4	6	75.23	24.77
2	25	0	5	6	6	81.31	18.69
3	25	0	7	4	6	80.62	19.38
4	25	0	3	4	6	8.10	91.90
5	25	1	5	4	6	79.51	20.49
6	25	0	5	4	10	68.64	31.36
7	25	0	5	6	10	60.59	39.41
8	25	0	6	6	10	66.84	33.16
9	25	0	7	6	10	69.88	30.12
10	25	0	8	6	10	82.79	17.21

TABLE 2 : PROXIMATE ANALYSIS - CONCENTRATING TABLE

SAMPLE ID	MOISTURE (%)	VOLATILES (%)	ASH (%)	FIXED CARBON (%)
		DRY BASIS		
#1 TAILS	0.40	23.42	76.58	0.00
#1 CONC.	0.44	22.74	77.26	0.00
#2 TAILS	0.36	22.89	77.94	0.00
#2 CONC.	0.42	22.87	77.75	0.00
#3 TAILS	0.31	23.74	76.26	0.00
#3 CONC.	0.41	22.92	77.08	0.00
#4 TAILS	0.68	22.72	77.94	0.00
#4 CONC.	0.46	23.51	77.75	0.57
#5 TAILS	0.25	23.32	76.68	0.00
#5 CONC.	0.35	22.55	77.45	0.00
#6 TAILS	0.58	23.31	77.94	0.00
#6 CONC.	0.36	22.35	77.75	0.00
#7 TAILS	0.29	23.22	76.78	0.00
#7 CONC.	0.41	22.22	77.78	0.00
#8 TAILS	0.28	23.49	77.94	0.00
#8 CONC.	0.35	22.63	77.75	0.00
#9 TAILS	0.34	23.31	76.69	0.00
#9 CONC.	0.34	22.90	77.10	0.00
#10 TAILS	0.27	23.94	77.94	0.00
#10 CONC.	0.29	22.40	77.75	0.00

TABLE 3 : ULTIMATE ANALYSIS CONCENTRATING TABLE

SAMPLE I.D.	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
#1 TAILS	11.11	1.19	0.48	7.65	0.89	76.27	1465
#1 CONC.	13.93	1.69	0.51	5.75	0.67	76.92	2021
#2 TAILS	11.66	1.29	0.47	7.98	1.01	77.66	1397
#2 CONC.	12.70	1.59	0.54	6.15	0.69	77.42	1990
#3 TAILS	10.94	1.14	0.46	8.55	0.81	76.02	1266
#3 CONC.	12.75	1.59	0.42	7.48	0.69	76.76	2040
#4 TAILS	12.20	1.46	0.42	6.79	0.72	77.41	1793
#4 CONC.	14.00	1.83	0.47	6.39	0.66	77.39	2539
#5 TAILS	10.82	1.15	0.46	8.88	0.91	76.49	1229
#5 CONC.	12.92	1.63	0.49	6.77	0.69	77.18	2183
#6 TAILS	10.82	1.13	0.38	8.57	0.71	77.49	1338
#6 CONC.	13.56	1.70	0.48	6.44	0.63	77.47	2131
#7 TAILS	11.30	1.20	0.53	8.19	0.79	76.56	1359
#7 CONC.	14.05	1.18	0.50	6.27	0.59	77.46	2174
#8 TAILS	10.81	1.17	0.51	9.85	0.73	77.72	1307
#8 CONC.	12.71	1.58	0.54	7.11	0.68	77.48	2235
#9 TAILS	11.46	1.18	0.47	7.89	0.81	76.43	1428
#9 CONC.	12.73	1.58	0.46	7.08	0.62	76.84	1987
#10 TAILS	10.81	1.06	0.44	9.98	0.88	77.73	1224
#10 CONC.	12.91	1.54	0.51	7.16	0.61	77.52	2042

@ CORRECTED FOR SULPHUR

TABLE 4 : ROCK-EVAL ANALYSIS - CONCENTRATING TABLE (AS DETERMINED)

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
#1 TAILS	0.00	6.19	56.00	441	7.06	0.10	793
#1 CONC.	0.00	7.61	76.95	443	9.56	0.09	805
#2 TAILS	0.00	6.40	57.18	443	7.31	0.10	782
#2 CONC.	0.00	7.71	73.95	443	9.14	0.09	809
#3 TAILS	0.00	5.74	50.45	442	6.63	0.10	761
#3 CONC.	0.00	7.94	79.93	444	9.94	0.09	804
#4 TAILS	0.00	8.27	72.51	444	8.98	0.10	807
#4 CONC.	0.00	7.18	95.50	443	11.39	0.07	838
#5 TAILS	0.00	5.27	51.98	439	6.77	0.09	768
#5 CONC.	0.00	7.79	82.85	440	10.18	0.09	814
#6 TAILS	0.00	6.75	53.72	439	6.90	0.11	779
#6 CONC.	0.00	7.41	83.90	440	10.25	0.08	819
#7 TAILS	0.00	6.16	58.11	439	7.61	0.10	764
#7 CONC.	0.00	7.88	86.19	441	10.47	0.08	823
#8 TAILS	0.00	4.43	50.82	441	6.58	0.08	772
#8 CONC.	0.00	6.50	83.56	442	10.14	0.07	824
#9 TAILS	0.00	6.23	58.33	442	7.39	0.10	789
#9 CONC.	0.00	7.03	81.84	442	9.98	0.08	820
#10 TAILS	0.00	5.15	50.18	440	6.47	0.09	776
#10 CONC.	0.00	6.71	76.84	441	9.52	0.08	807

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - CONCENTRATING TABLE

Sample I.D.	SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	SO_3@ wt%	LOI wt%	TOTAL MAJORS
#1 TAILS	40.6	11.30	0.55	5.45	0.11	3.53	10.80	1.37	2.10	0.52	2.22	22.3	100.9
#1 CONC.	43.3	11.90	0.59	4.81	0.09	2.71	7.38	1.47	2.19	0.54	1.67	23.5	100.2
#2 TAILS	40.5	11.40	0.56	5.48	0.11	3.43	10.80	1.35	2.15	0.51	2.52	22.2	101.0
#2 CONC.	43.6	12.1	0.60	4.92	0.09	2.83	7.61	1.42	2.17	0.53	1.72	23.0	100.6
#3 TAILS	39.2	11.10	0.55	5.32	0.11	3.76	11.90	1.31	2.11	0.49	2.02	22.7	100.6
#3 CONC.	43.70	12.10	0.60	4.82	0.09	2.72	6.99	1.39	2.17	0.53	1.72	23.1	99.9
#4 TAILS	42.70	11.90	0.59	4.98	0.10	2.99	8.34	1.42	2.20	0.52	1.80	22.8	100.3
#4 CONC.	45.70	12.10	0.60	4.59	0.09	2.20	6.29	1.44	1.95	0.53	1.65	24.4	101.5
#5 TAILS	39.30	11.10	0.55	5.56	0.11	3.81	12.0	1.30	2.09	0.50	2.27	22.4	101.0
#5 CONC.	44.10	12.20	0.60	4.79	0.09	2.65	6.92	1.42	2.16	0.53	1.72	23.2	100.4
#6 TAILS	40.40	11.40	0.56	5.32	0.11	3.67	10.90	1.31	2.14	0.50	1.77	22.3	100.4
#6 CONC.	44.40	12.20	0.60	4.76	0.09	2.54	6.48	1.47	2.20	0.54	1.57	23.2	100.1
#7 TAILS	40.40	11.40	0.57	5.28	0.11	3.65	10.40	1.36	2.16	0.50	1.97	22.2	100.0
#7 CONC.	44.8	12.30	0.61	4.76	0.09	2.45	6.21	1.44	2.20	0.55	1.47	22.9	99.8
#8 TAILS	40.5	11.40	0.56	5.26	0.11	3.73	11.2	1.33	2.07	0.49	1.82	22.1	100.6
#8 CONC.	44.4	12.2	0.60	4.77	0.09	2.55	6.51	1.45	2.21	0.53	1.70	23.1	100.1
#9 TAILS	41.2	11.60	0.57	5.22	0.11	3.45	10.10	1.33	2.15	0.49	2.02	22.3	100.5
#9 CONC.	44.20	12.20	0.60	4.76	0.09	2.65	6.84	1.44	2.17	0.52	1.55	23.2	100.2
#10 TAILS	39.30	11.20	0.54	5.33	0.11	3.68	12.20	1.26	2.11	0.48	2.20	22.4	100.8
#10 CONC.	43.90	12.20	0.60	4.82	0.09	2.66	7.04	1.44	2.21	0.53	1.52	22.8	99.8

@ SO_3 CALCULATED FROM LECO TOTAL SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - CONCENTRATING TABLE - MAJOR ELEMENTS AND CARBONATES CALCULATED

CALCULATED	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	MgCO3 wt.%	CaCO3 wt.%
#1 TAILS	19.0	5.98	0.33	3.8	0.085	2.13	7.7	1.02	1.7	0.23	0.89	7.39	19.28
#1 CONC.	20.2	6.30	0.35	3.4	0.070	1.63	5.3	1.09	1.8	0.24	0.67	5.67	13.17
#2 TAILS	18.9	6.03	0.34	3.8	0.085	2.07	7.7	1.00	1.8	0.22	1.01	7.18	19.28
#2 CONC.	20.4	6.41	0.36	3.4	0.070	1.71	5.4	1.05	1.8	0.23	0.69	5.92	13.58
#3 TAILS	18.3	5.88	0.33	3.7	0.085	2.27	8.5	0.97	1.8	0.21	0.81	7.87	21.24
#3 CONC.	20.4	6.41	0.36	3.4	0.070	1.64	5.0	1.03	1.8	0.23	0.69	5.69	12.46
#4 TAILS	20.0	6.30	0.35	3.5	0.077	1.80	6.0	1.05	1.8	0.23	0.72	6.26	14.89
#4 CONC.	21.4	6.41	0.36	3.2	0.070	1.33	4.5	1.07	1.6	0.23	0.66	4.60	11.23
#5 TAILS	18.4	5.88	0.33	3.9	0.085	2.30	8.6	0.96	1.7	0.22	0.91	7.97	21.42
#5 CONC.	20.6	6.46	0.36	3.3	0.070	1.60	4.9	1.05	1.8	0.23	0.69	5.54	12.35
#6 TAILS	18.9	6.03	0.34	3.7	0.085	2.21	7.8	0.97	1.8	0.22	0.71	7.68	19.45
#6 CONC.	20.8	6.46	0.36	3.3	0.070	1.53	4.6	1.09	1.8	0.24	0.63	5.31	11.57
#7 TAILS	18.9	6.03	0.34	3.7	0.085	2.20	7.4	1.01	1.8	0.22	0.79	7.64	18.56
#7 CONC.	20.9	6.51	0.37	3.3	0.070	1.48	4.4	1.07	1.8	0.24	0.59	5.13	11.08
#8 TAILS	18.9	6.03	0.34	3.7	0.085	2.25	8.0	0.99	1.7	0.21	0.73	7.80	19.99
#8 CONC.	20.8	6.46	0.36	3.3	0.070	1.54	4.7	1.08	1.8	0.23	0.68	5.34	11.62
#9 TAILS	19.3	6.14	0.34	3.7	0.085	2.08	7.2	0.99	1.8	0.21	0.81	7.22	18.03
#9 CONC.	20.7	6.46	0.36	3.3	0.070	1.60	4.9	1.07	1.8	0.23	0.62	5.54	12.21
#10 TAILS	18.4	5.93	0.32	3.7	0.085	2.22	8.7	0.93	1.8	0.21	0.88	7.70	21.78
#10 CONC.	20.5	6.46	0.36	3.4	0.070	1.60	5.0	1.07	1.8	0.23	0.61	5.57	12.57

@ S determined directly from LECO

TABLE 7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - CONCENTRATING TABLE

Sample I.D	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
#1 TAILS	50	80	610	10	70	20	390
#1 CONC.	60	90	480	20	90	10	380
#2 TAILS	50	90	590	20	90	10	340
#2 CONC.	60	90	480	20	90	10	380
#3 TAILS	50	100	640	20	80	20	320
#3 CONC.	60	100	470	20	100	30	390
#4 TAILS	60	110	520	30	100	10	400
#4 CONC.	60	90	410	10	90	20	400
#5 TAILS	50	90	630	10	80	20	350
#5 CONC.	60	100	450	20	90	20	380
#6 TAILS	50	90	600	20	80	10	370
#6 CONC.	60	100	430	<10	90	20	400
#7 TAILS	50	100	610	10	70	20	380
#7 CONC.	60	110	440	<10	110	10	380
#8 TAILS	50	90	590	20	70	10	350
#8 CONC.	60	110	460	20	110	10	390
#9 TAILS	50	90	580	<10	100	20	380
#9 CONC.	60	100	460	30	90	20	400
#10 TAILS	50	80	620	20	90	<10	330
#10 CONC.	60	110	470	20	90	20	390

TABLE 8 : ORGANIC AND CARBONATE RECOVERIES - CONCENTRATING TABLE

TEST NO.	CONC. (wt.%)	TAILS (wt.%)	ORGANICS IN CLEAN		CARBONATES IN REFUSE	
			T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	$CaCO_3$ RECOVERY	$MgCO_3$ RECOVERY
TEST # 1	75.23	24.77	79.82	79.48	34.60	30.75
TEST # 2	81.31	18.69	82.48	84.58	26.11	22.54
TEST # 3	80.62	19.38	88.94	85.97	29.83	25.62
TEST # 4	8.10	91.90	10.24	10.75	99.13	96.63
TEST # 5	79.51	20.49	89.83	90.73	31.80	27.45
TEST # 6	68.64	31.36	78.09	76.46	44.21	40.47
TEST # 7	60.59	39.41	70.41	68.86	53.01	50.58
TEST # 8	66.84	33.16	75.22	78.09	48.03	43.49
TEST # 9	69.88	30.12	77.40	72.58	39.35	36.54
TEST # 10	82.79	17.21	87.48	88.37	27.16	22.27

Figure 1.

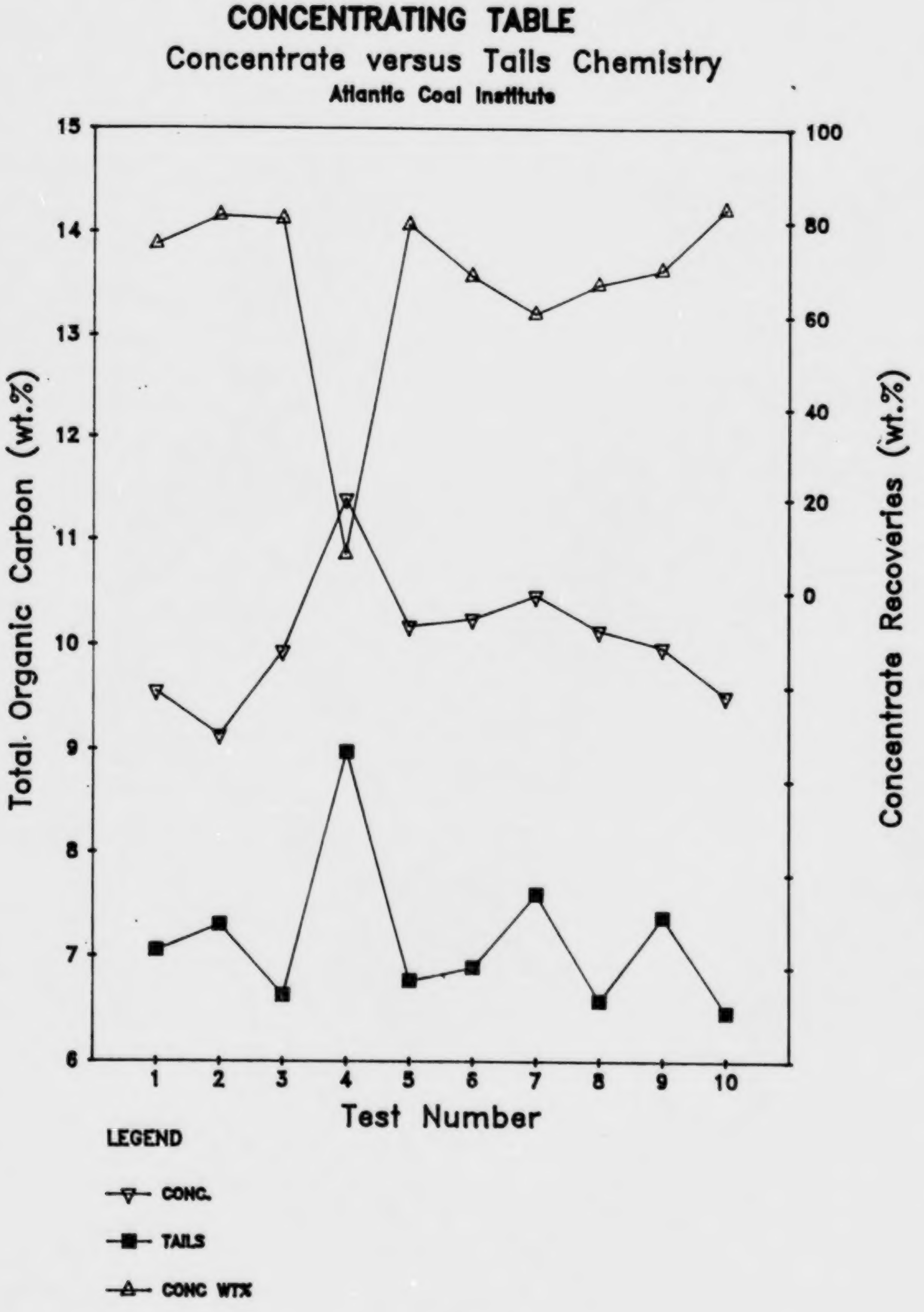

CONCENTRATING TABLE
Concentrate versus Tails Chemistry
Atlantic Coal Institute
Total Organic Carbon (wt.%)
15
14
13
12
11
10
9
8
7
6
Concentrate Recoveries (wt.%)
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
Test Number
LEGEND
CONC.
TAILS
CONC WT%

Figure 2.

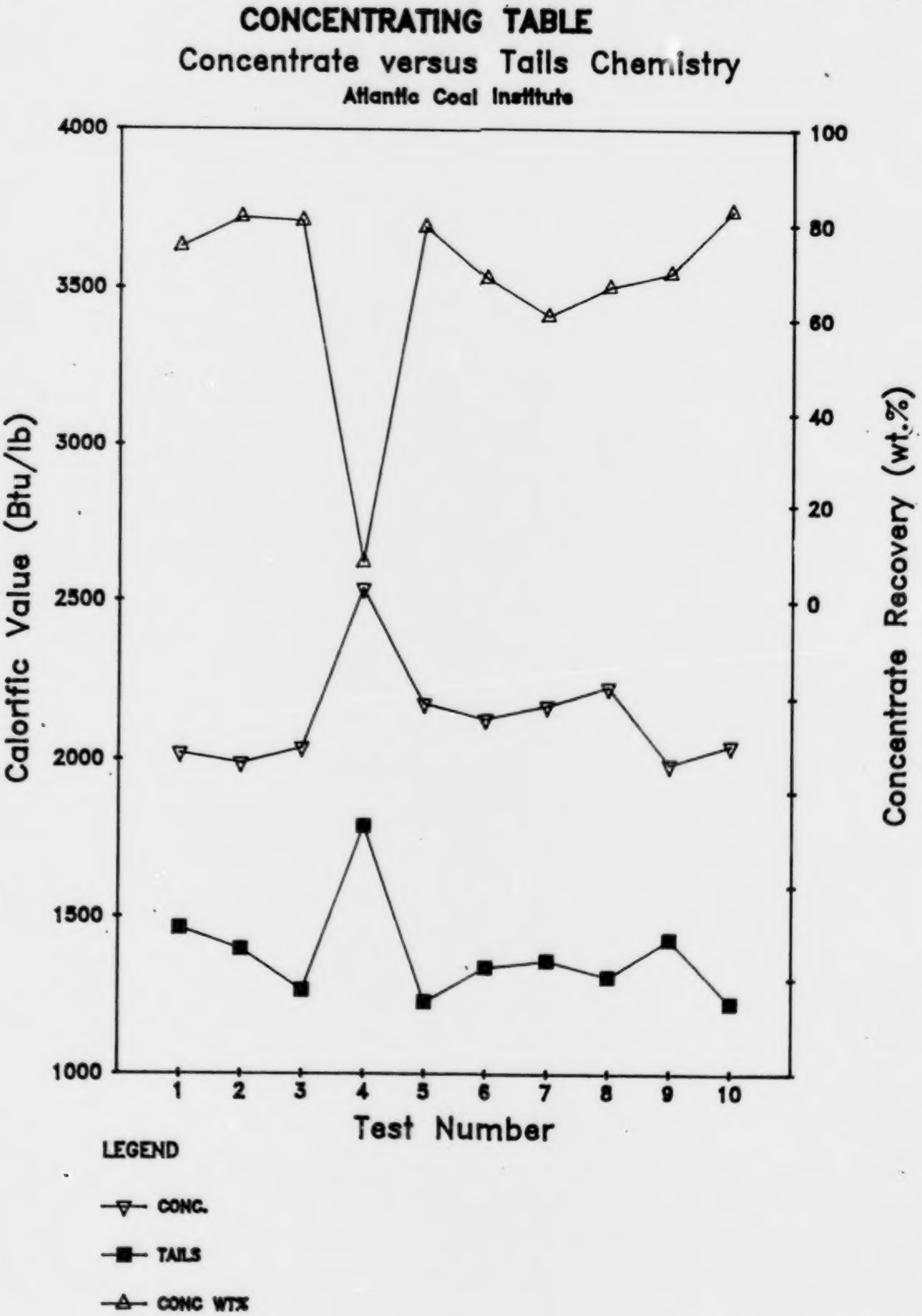
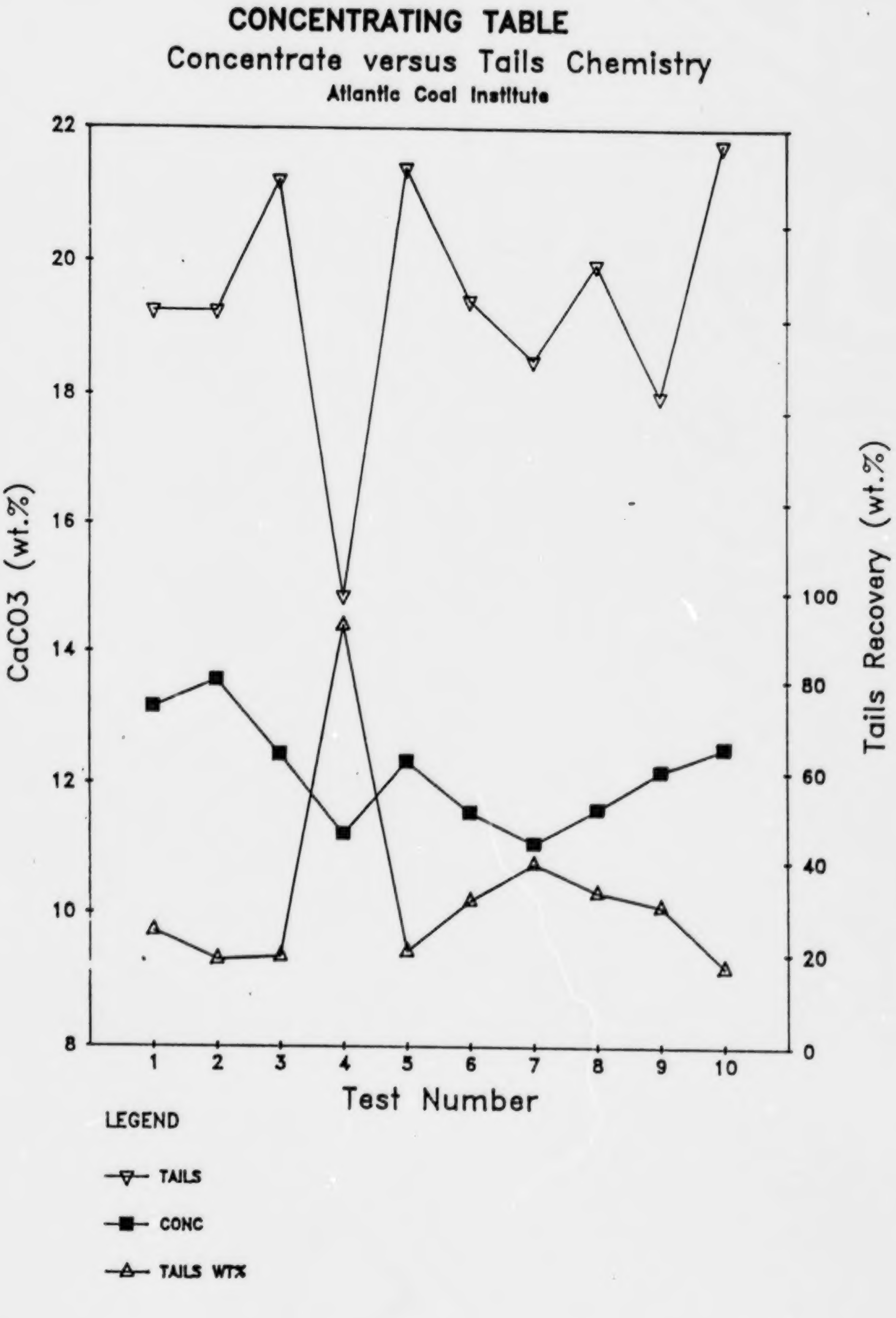

CONCENTRATING TABLE
Concentrate versus Tails Chemistry
Atlantic Coal Institute
Calorific Value (Btu/lb)
4000
3500
3000
2500
2000
1500
1000
Concentrate Recovery (wt.%)
100
80
60
40
20
0
Test Number
1
2
3
4
5
6
7
8
9
10
LEGEND
▽ CONC.
■ TAILS
△ CONC WT%

Figure 3.



CONCENTRATING TABLE
Concentrate versus Tails Chemistry
Atlantic Coal Institute

APPENDIX I

ANALYTICAL DATA

E. Jigging Test

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TABLE 1 : JIGGING TEST PARAMETERS AND RECOVERIES

TEST NO.	PARTICLE SIZE (mesh)	FLOW RATE (l/min)	STROKE LENGTH (mm)	BEDDING MATERIAL	CLEAN (wt.%)	REFUSE (wt.%)
TEST # 1	-40	1.5	6.0	IRON SHOT	70.50	29.50
TEST # 2	-40	2.0	6.0	IRON SHOT	91.43	8.57
TEST # 3	-20	1.0	10.0	IRON SHOT	28.32	71.68
TEST # 4	-20	1.5	10.0	IRON SHOT	39.44	60.56
TEST # 5	-40	1.0	10.0	IRON SHOT	52.06	47.94
TEST # 6	-40	1.5	10.0	IRON SHOT	58.56	41.44
TEST # 7	-20	1.0	10.0	-1/2" +4m OIL SHALE	29.64	70.36
TEST # 8	-20	1.5	10.0	-1/2" +4m OIL SHALE	43.44	56.56
TEST # 9	-40	1.0	10.0	-1/2" +4m OIL SHALE	70.17	29.83
TEST # 10	-40	1.5	10.0	-1/2" +4m OIL SHALE	80.53	19.47
TEST # 11	-20	1.0	6.0	-1/2" +4m OIL SHALE	40.83	59.17
TEST # 12	-20	1.5	6.0	-1/2" +4m OIL SHALE	48.52	51.48
TEST # 13	-20	2.0	6.0	-1/2" +4m OIL SHALE	69.96	30.04
TEST # 14	-40	1.0	6.0	-1/2" +4m OIL SHALE	61.93	38.07
TEST # 15	-40	1.5	6.0	-1/2" +4m OIL SHALE	81.30	18.70
TEST # 16	-40	1.5	6.0	-1/2" +4m OIL SHALE	70.09	29.91
TEST # 17	-20	1.0	6.0	IRON SHOT	42.13	57.87
TEST # 18	-20	1.5	6.0	IRON SHOT	37.55	62.45
TEST # 19	-20	1.5	6.0	QUARTZ	65.40	34.60
TEST # 20	-20	1.5	10.0	QUARTZ	54.87	45.13

* THE SAME PARAMETERS WERE USED FOR TESTS 15 AND 16 TO COMPARE RESULTS

TABLE 2 : PROXIMATE ANALYSIS-JIGGING TEST

SAMPLE ID	MOISTURE (%)	VOLATILES (%)	ASH (%)	FIXED CARBON (%)
		DRY BASIS		
# 1 CLEAN	0.44	22.64	77.02	0.33
# 1 REFUSE	0.28	22.92	76.91	0.17
# 2 CLEAN	0.57	22.32	77.10	0.58
# 2 REFUSE	0.46	22.97	76.91	0.12
# 3 CLEAN	0.71	22.06	77.77	0.17
# 3 REFUSE	0.46	23.11	76.84	0.05
# 4 CLEAN	0.83	22.48	77.52	0.00
# 4 REFUSE	0.52	23.11	76.89	0.00
# 5 CLEAN	0.90	22.92	77.08	0.00
# 5 REFUSE	0.82	22.86	77.00	0.14
# 6 CLEAN	0.54	22.88	77.12	0.00
# 6 REFUSE	0.49	23.42	76.58	0.00
# 7 CLEAN	0.87	22.44	77.56	0.00
# 7 REFUSE	0.79	23.01	76.99	0.00
# 8 CLEAN	1.07	23.23	76.77	0.00
# 8 REFUSE	0.64	22.68	77.22	0.11
# 9 CLEAN	1.46	22.76	77.13	0.11
# 9 REFUSE	0.77	22.45	77.52	0.02
# 10 CLEAN	0.44	22.84	77.08	0.08
# 10 REFUSE	0.39	21.92	78.01	0.07

TABLE 2 : PROXIMATE ANALYSIS-JIGGING TEST

SAMPLE ID	MOISTURE (%)	VOLATILES (%)	ASH (%)	FIXED CARBON (%)
		DRY BASIS		
# 11 CLEAN	0.41	21.94	77.32	0.74
# 11 REFUSE	0.40	22.27	77.29	0.44
# 12 CLEAN	0.70	22.68	76.98	0.34
# 12 REFUSE	0.59	22.44	77.20	0.36
# 13 CLEAN	0.88	22.58	77.30	0.12
# 13 REFUSE	0.70	22.33	77.67	0.00
# 14 CLEAN	0.40	22.50	77.37	0.13
# 14 REFUSE	0.35	22.47	77.53	0.00
# 15 CLEAN	0.80	22.63	77.11	0.25
# 15 REFUSE	0.50	23.09	76.91	0.00
# 16 CLEAN	0.42	22.81	77.19	0.00
# 16 REFUSE	0.36	22.76	77.24	0.00
# 17 CLEAN	0.46	22.81	77.19	0.00
# 17 REFUSE	0.37	22.80	77.20	0.00
# 18 CLEAN	0.48	22.62	77.38	0.00
# 18 REFUSE	0.48	23.08	76.92	0.00
# 19 CLEAN	0.31	23.25	76.75	0.00
# 19 REFUSE	0.20	22.16	77.84	0.00
# 20 CLEAN	0.50	23.02	76.98	0.00
# 20 REFUSE	0.09	22.51	77.49	0.00

TABLE 3 : ULTIMATE ANALYSIS - JIGGING TEST (AS DETERMINED)

SAMPLE I.D.	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
#1 CLEAN	12.19	1.47	0.45	5.85	0.76	76.68	1970
#1 REFUSE	12.14	1.40	0.48	7.53	0.89	76.69	1615
#2 CLEAN	12.81	1.48	0.45	7.41	0.71	76.66	1941
#2 REFUSE	11.06	1.12	0.49	8.60	0.75	76.56	1429
#3 CLEAN	12.87	1.60	0.47	6.58	0.69	77.22	1976
#3 REFUSE	12.64	1.50	0.52	7.03	0.68	76.49	1783
#4 CLEAN	12.60	1.69	0.48	6.85	0.61	76.88	1945
#4 REFUSE	12.13	1.46	0.48	7.20	0.74	76.49	1730
#5 CLEAN	12.53	1.60	0.44	6.98	0.66	76.39	1981
#5 REFUSE	12.46	1.46	0.40	7.81	0.77	76.37	1734
#6 CLEAN	12.53	1.53	0.52	7.16	0.65	76.70	1959
#6 REFUSE	11.93	1.38	0.50	7.62	0.81	76.20	1807
#7 CLEAN	12.40	1.57	0.41	7.04	0.65	76.89	1996
#7 REFUSE	12.71	1.52	0.43	7.38	0.71	76.38	1739
#8 CLEAN	13.39	1.72	0.39	6.98	0.67	75.95	2023
#8 REFUSE	12.34	1.47	0.48	7.88	0.71	76.73	1621
#9 CLEAN	12.27	1.47	0.56	7.36	0.81	76.00	1949
#9 REFUSE	11.70	1.31	0.53	8.74	0.96	76.92	1592
#10 CLEAN	12.33	1.52	0.53	6.96	0.73	76.74	1985
#10 REFUSE	10.99	1.13	0.43	9.03	0.86	77.71	1387

@ CORRECTED FOR SULPHUR

TABLE 3 : ULTIMATE ANALYSIS - JIGGING TEST (AS DETERMINED)

SAMPLE I.D.	CARBON WT%	HYDROGEN WT%	NITROGEN WT%	OXYGEN WT%	SULFUR WT%	ASH WT%	CALORIFIC@ VALUE (BTU/LB)
#11 CLEAN	12.81	1.50	0.55	5.79	0.73	77.00	1952
#11 REFUSE	12.00	1.39	0.59	6.83	0.76	76.98	1738
#12 CLEAN	12.38	1.47	0.52	6.71	0.72	76.44	2027
#12 REFUSE	11.94	1.38	0.57	7.28	0.84	76.74	1586
#13 CLEAN	12.00	1.49	0.55	6.46	0.71	76.62	1978
#13 REFUSE	12.41	1.31	0.54	7.21	0.82	77.13	1566
#14 CLEAN	13.34	1.62	0.55	6.60	0.64	77.06	2032
#14 REFUSE	12.07	1.34	0.64	7.55	0.71	77.26	1500
#15 CLEAN	12.57	1.53	0.57	7.28	0.77	76.49	2012
#15 REFUSE	10.98	1.18	0.53	8.48	1.03	76.53	1400
#16 CLEAN	12.99	1.66	0.54	6.55	0.73	76.87	1970
#16 REFUSE	11.40	1.36	0.52	8.58	0.85	76.96	1413
#17 CLEAN	12.30	1.51	0.53	7.00	1.19	76.83	1882
#17 REFUSE	12.14	1.44	0.54	7.56	0.86	76.91	1727
#18 CLEAN	12.24	1.46	0.55	6.59	0.82	77.01	1865
#18 REFUSE	11.02	1.24	0.50	7.21	0.78	76.55	1728
#19 CLEAN	12.38	1.39	0.59	6.78	0.71	76.51	1969
#19 REFUSE	11.48	1.29	0.57	7.88	0.71	77.68	1486
#20 CLEAN	13.00	1.50	0.54	7.11	0.64	76.60	2033
#20 REFUSE	11.70	1.34	0.62	7.66	0.78	77.42	1575

@ CORRECTED FOR SULPHUR

TABLE 4 : ROCK-EVAL ANALYSIS - JIGGING TEST

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
#1 CLEAN	0.00	6.33	71.96	442	8.86	0.08	812
#1 REFUSE	0.00	6.53	63.73	444	7.75	0.09	822
#2 CLEAN	0.00	5.19	72.56	443	9.16	0.07	792
#2 REFUSE	0.00	4.96	58.77	442	7.51	0.08	783
#3 CLEAN	0.00	7.84	72.35	442	9.20	0.10	786
#3 REFUSE	0.00	7.81	72.51	444	9.06	0.10	800
#4 CLEAN	0.00	7.09	72.64	442	8.71	0.09	834
#4 REFUSE	0.00	7.54	68.60	442	8.38	0.10	819
#5 CLEAN	0.00	7.71	71.81	441	9.09	0.10	790
#5 REFUSE	0.00	7.76	69.34	442	8.64	0.10	803
#6 CLEAN	0.00	6.90	73.15	442	9.03	0.09	810
#6 REFUSE	0.00	6.99	66.14	442	8.16	0.10	811
#7 CLEAN	0.00	6.62	73.77	441	9.17	0.08	804
#7 REFUSE	0.00	7.90	70.13	441	8.72	0.10	804
#8 CLEAN	0.00	8.00	77.13	442	9.75	0.09	791
#8 REFUSE	0.00	7.69	66.92	443	8.38	0.10	799
#9 CLEAN	0.00	8.23	76.40	442	9.51	0.10	803
#9 REFUSE	0.00	7.41	61.32	442	7.76	0.11	790
#10 CLEAN	0.00	7.94	76.60	442	9.50	0.09	806
#10 REFUSE	0.00	6.55	57.09	440	7.43	0.10	768

TABLE 4 : ROCK-EVAL ANALYSIS - JIGGING TEST

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC
#11 CLEAN	0.00	4.96	75.77	441	9.01	0.06	841
#11 REFUSE	0.00	6.77	70.78	442	8.69	0.09	814
#12 CLEAN	0.00	7.10	80.06	442	9.62	0.08	832
#12 REFUSE	0.00	7.36	69.72	442	8.45	0.10	825
#13 CLEAN	0.00	7.86	75.80	442	9.20	0.09	824
#13 REFUSE	0.00	7.45	64.31	442	7.87	0.10	817
#14 CLEAN	0.00	7.33	79.67	441	9.72	0.08	820
#14 REFUSE	0.00	6.62	64.72	441	8.00	0.09	809
#15 CLEAN	0.00	7.79	74.54	442	9.30	0.09	802
#15 REFUSE	0.00	6.75	54.10	440	7.03	0.11	770
#16 CLEAN	0.00	7.43	75.13	440	9.46	0.09	794
#16 REFUSE	0.00	6.55	56.41	441	7.29	0.10	774
#17 CLEAN	0.00	6.57	67.43	441	8.80	0.09	766
#17 REFUSE	0.00	6.84	66.57	442	8.60	0.09	774
#18 CLEAN	0.00	5.81	66.14	439	9.15	0.08	723
#18 REFUSE	0.00	7.51	69.08	441	8.74	0.10	790
#19 CLEAN	0.00	5.94	78.03	441	9.22	0.07	846
#19 REFUSE	0.00	5.93	62.73	439	7.85	0.09	799
#20 CLEAN	0.00	6.19	80.47	440	9.79	0.07	822
#20 REFUSE	0.00	6.15	65.89	438	8.35	0.09	789

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - JIGGING TEST

SAMPLE I.D.		SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	SO_3@ wt%	LOI wt%	TOTAL MAJORS
#1	CLEAN	43.8	12.0	0.60	4.85	0.09	2.65	7.43	1.37	2.15	0.54	1.90	22.8	100.2
#1	REFUSE	42.4	11.8	0.59	5.30	0.10	3.25	8.88	1.38	2.12	0.54	2.22	22.4	101.0
#2	CLEAN	43.6	12.1	0.60	4.86	0.09	2.70	7.39	1.41	2.20	0.53	1.77	22.7	100.0
#2	REFUSE	41.7	11.7	0.58	5.10	0.10	3.41	9.22	1.40	2.22	0.51	1.87	22.2	100.0
#3	CLEAN	44.3	12.3	0.60	4.85	0.09	2.48	7.01	1.35	2.21	0.55	1.72	22.5	100.0
#3	REFUSE	43.5	12.1	0.59	4.91	0.09	2.86	7.91	1.40	2.20	0.55	1.70	22.5	100.3
#4	CLEAN	43.9	12.2	0.60	4.82	0.10	2.58	7.17	1.36	2.19	0.55	1.52	22.6	99.6
#4	REFUSE	43.4	12.1	0.59	4.97	0.10	2.98	7.97	1.40	2.24	0.54	1.85	22.5	100.6
#5	CLEAN	44.0	12.2	0.60	4.82	0.09	2.69	7.31	1.36	2.18	0.52	1.65	22.8	100.2
#5	REFUSE	42.1	11.8	0.57	4.92	0.10	3.07	8.52	1.38	2.20	0.52	1.92	22.9	100.0
#6	CLEAN	44.2	12.2	0.60	4.81	0.09	2.70	7.24	1.43	2.19	0.52	1.62	22.6	100.2
#6	REFUSE	42.2	11.8	0.58	4.94	0.10	3.15	8.49	1.32	2.18	0.52	2.02	22.7	100.0
#7	CLEAN	44.6	12.3	0.60	4.78	0.09	2.51	6.98	1.38	2.19	0.52	1.62	22.3	99.9
#7	REFUSE	43.3	12.1	0.59	4.92	0.09	2.89	8.02	1.40	2.20	0.52	1.77	22.4	100.2
#8	CLEAN	44.0	12.2	0.59	4.70	0.10	2.57	7.05	1.43	2.18	0.53	1.67	23.2	100.2
#8	REFUSE	42.1	11.7	0.58	4.97	0.10	3.14	8.67	1.35	2.22	0.52	1.77	22.9	100.0
#9	CLEAN	43.8	12.2	0.59	4.76	0.09	2.55	7.22	1.41	2.19	0.53	2.02	23.1	100.5
#9	REFUSE	41.3	11.7	0.58	5.28	0.10	3.22	9.48	1.39	2.19	0.52	2.40	22.5	100.7
#10	CLEAN	44.0	12.2	0.60	4.84	0.09	2.66	7.02	1.43	2.22	0.53	1.82	22.8	100.2
#10	REFUSE	41.5	11.8	0.58	5.27	0.11	3.56	9.63	1.37	2.21	0.50	2.15	21.9	100.6

@ CALCULATED FROM LECO WEIGHT PERCENT SULPHUR

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - JIGGING TEST

SAMPLE I.D.	SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	SO_3@ wt%	LOI wt%	TOTAL MAJORS
#11 CLEAN	44.3	12.3	0.60	4.77	0.10	2.60	7.30	1.43	2.17	0.53	1.82	22.6	100.5
#11 REFUSE	42.9	12.0	0.59	5.02	0.10	3.04	8.38	1.44	2.22	0.52	1.90	22.4	100.5
#12 CLEAN	44.4	12.2	0.61	4.85	0.09	2.67	7.24	1.40	2.14	0.53	1.80	22.9	100.8
#12 REFUSE	42.4	11.9	0.59	5.12	0.10	3.21	8.64	1.38	2.17	0.51	2.10	22.5	100.6
#13 CLEAN	44.1	12.2	0.60	4.82	0.10	2.65	7.22	1.45	2.18	0.58	1.77	22.6	100.3
#13 REFUSE	42.5	11.9	0.59	5.16	0.10	3.21	8.82	1.45	2.23	0.56	2.05	21.9	100.5
#14 CLEAN	44.9	12.4	0.61	4.82	0.09	2.61	7.08	1.48	2.17	0.53	1.60	22.6	100.9
#14 REFUSE	42.5	12.0	0.59	4.98	0.10	3.18	8.73	1.42	2.24	0.50	1.77	22.0	100.0
#15 CLEAN	44.1	12.2	0.60	4.82	0.09	2.64	7.08	1.44	2.18	0.52	1.92	22.8	100.4
#15 REFUSE	40.9	11.6	0.57	5.36	0.11	3.49	9.98	1.34	2.19	0.48	2.57	22.0	100.6
#16 CLEAN	44.2	12.2	0.60	4.77	0.09	2.64	7.08	1.39	2.18	0.52	1.82	23.0	100.5
#16 REFUSE	41.3	11.7	0.58	5.18	0.10	3.42	9.54	1.40	2.23	0.50	2.12	22.1	100.2
#17 CLEAN	44.3	12.2	0.60	5.40	0.10	2.68	7.68	1.38	2.04	0.51	2.97	22.1	102.0
#17 REFUSE	43.2	12.0	0.60	5.12	0.10	3.00	7.88	1.42	2.23	0.52	2.15	22.3	100.5
#18 CLEAN	44.6	12.3	0.61	5.00	0.10	2.67	7.51	1.41	2.12	0.55	2.05	22.2	101.1
#18 REFUSE	43.5	12.2	0.60	4.90	0.10	2.92	7.71	1.39	2.19	0.53	1.95	22.5	100.5
#19 CLEAN	44.9	12.4	0.62	4.89	0.09	2.70	7.26	1.42	2.14	0.54	1.77	22.6	101.3
#19 REFUSE	41.9	11.8	0.58	5.01	0.10	3.30	9.43	1.38	2.21	0.51	1.77	22.1	100.1
#20 CLEAN	44.3	12.2	0.60	4.88	0.09	2.66	7.25	1.53	2.19	0.54	1.60	22.7	100.5
#20 REFUSE	43.4	12.1	0.60	5.20	0.10	3.28	9.29	1.42	2.08	0.54	1.95	22.2	102.2

@ CALCULATED FROM LECO WEIGHT PERCENT SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - JIGGING TEST - MAJOR ELEMENTS AND CARBONATES CALCULATED

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	CaCO3 wt.%	MgCO3 wt.%
#1 CLEAN	20.5	6.35	0.36	3.4	0.070	1.60	5.3	1.02	1.8	0.24	0.76	13.26	5.54
#1 REFUSE	19.8	6.25	0.35	3.7	0.077	1.96	6.3	1.02	1.8	0.24	0.89	15.85	6.80
#2 CLEAN	20.4	6.41	0.36	3.4	0.070	1.63	5.3	1.05	1.8	0.23	0.71	13.19	5.65
#2 REFUSE	19.5	6.19	0.35	3.6	0.077	2.06	6.6	1.04	1.8	0.22	0.75	16.46	7.13
#3 CLEAN	20.7	6.51	0.36	3.4	0.070	1.50	5.0	1.00	1.8	0.24	0.69	12.51	5.19
#3 REFUSE	20.3	6.41	0.35	3.4	0.070	1.72	5.7	1.04	1.8	0.24	0.68	14.12	5.98
#4 CLEAN	20.5	6.46	0.36	3.4	0.077	1.56	5.1	1.01	1.8	0.24	0.61	12.80	5.40
#4 REFUSE	20.3	6.41	0.35	3.5	0.077	1.80	5.7	1.04	1.9	0.24	0.74	14.23	6.23
#5 CLEAN	20.6	6.46	0.36	3.4	0.070	1.62	5.2	1.01	1.8	0.23	0.66	13.05	5.63
#5 REFUSE	19.7	6.25	0.34	3.4	0.077	1.85	6.1	1.02	1.8	0.23	0.77	15.21	6.42
#6 CLEAN	20.7	6.46	0.36	3.4	0.070	1.63	5.2	1.06	1.8	0.23	0.65	12.92	5.65
#6 REFUSE	19.7	6.25	0.35	3.5	0.077	1.90	6.1	0.98	1.8	0.23	0.81	15.15	6.59
#7 CLEAN	20.9	6.51	0.36	3.3	0.070	1.51	5.0	1.02	1.8	0.23	0.65	12.46	5.25
#7 REFUSE	20.2	6.41	0.35	3.4	0.070	1.74	5.7	1.04	1.8	0.23	0.71	14.31	6.05
#8 CLEAN	20.6	6.46	0.35	3.3	0.077	1.55	5.0	1.06	1.8	0.23	0.67	12.58	5.38
#8 REFUSE	19.7	6.19	0.35	3.5	0.077	1.89	6.2	1.00	1.8	0.23	0.71	15.47	6.57
#9 CLEAN	20.5	6.46	0.35	3.3	0.070	1.54	5.2	1.05	1.8	0.23	0.81	12.89	5.34
#9 REFUSE	19.3	6.19	0.35	3.7	0.077	1.94	6.8	1.03	1.8	0.23	0.96	16.92	6.74
#10 CLEAN	20.6	6.46	0.36	3.4	0.070	1.60	5.0	1.06	1.8	0.23	0.73	12.53	5.57
#10 REFUSE	19.4	6.25	0.35	3.7	0.085	2.15	6.9	1.02	1.8	0.22	0.86	17.19	7.45

@ LECO WEIGHT PERCENT SULPHUR

TABLE 6 : XRF WHOLE ROCK ANALYSIS - JIGGING TEST - MAJOR ELEMENTS AND CARBONATES CALCULATED

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	S@ wt.%	CaCO3 wt.%	MgCO3 wt.%
#11 CLEAN	20.7	6.51	0.36	3.3	0.077	1.57	5.2	1.06	1.8	0.23	0.73	12.98	5.45
#11 REFUSE	20.1	6.35	0.35	3.5	0.077	1.83	6.0	1.07	1.8	0.23	0.76	14.96	6.35
#12 CLEAN	20.8	6.46	0.37	3.4	0.070	1.61	5.2	1.04	1.8	0.23	0.72	12.92	5.59
#12 REFUSE	19.8	6.30	0.35	3.6	0.077	1.94	6.2	1.02	1.8	0.22	0.84	15.42	6.73
#13 CLEAN	20.6	6.46	0.36	3.4	0.077	1.60	5.2	1.08	1.8	0.25	0.71	12.89	5.55
#13 REFUSE	19.9	6.30	0.35	3.6	0.077	1.94	6.3	1.08	1.9	0.24	0.82	15.74	6.73
#14 CLEAN	21.0	6.56	0.37	3.4	0.070	1.57	5.1	1.10	1.8	0.23	0.64	12.64	5.45
#14 REFUSE	19.9	6.35	0.35	3.5	0.077	1.92	6.2	1.05	1.9	0.22	0.71	15.58	6.66
#15 CLEAN	20.6	6.46	0.36	3.4	0.070	1.59	5.1	1.07	1.8	0.23	0.77	12.64	5.52
#15 REFUSE	19.1	6.14	0.34	3.7	0.085	2.10	7.1	0.99	1.8	0.21	1.03	17.81	7.28
#16 CLEAN	20.7	6.46	0.36	3.3	0.070	1.59	5.1	1.03	1.8	0.23	0.73	12.64	5.52
#16 REFUSE	19.3	6.19	0.35	3.6	0.077	2.06	6.8	1.04	1.9	0.22	0.85	17.03	7.15
#17 CLEAN	20.7	6.46	0.36	3.8	0.077	1.62	5.5	1.02	1.7	0.22	1.19	13.71	5.62
#17 REFUSE	20.2	6.35	0.36	3.6	0.077	1.81	5.6	1.05	1.9	0.23	0.86	14.06	6.28
#18 CLEAN	20.9	6.51	0.37	3.5	0.077	1.61	5.4	1.05	1.8	0.24	0.82	13.4	5.59
#18 REFUSE	20.3	6.46	0.36	3.4	0.077	1.76	5.5	1.03	1.8	0.23	0.78	13.76	6.11
#19 CLEAN	21.0	6.56	0.37	3.4	0.070	1.63	5.2	1.05	1.8	0.24	0.71	12.96	5.65
#19 REFUSE	19.6	6.25	0.35	3.5	0.077	1.99	6.7	1.02	1.8	0.22	0.71	16.83	6.90
#20 CLEAN	20.7	6.46	0.36	3.4	0.070	1.60	5.2	1.14	1.8	0.24	0.64	12.94	5.55
#20 REFUSE	20.3	6.41	0.36	3.6	0.077	1.98	6.6	1.05	1.7	0.24	0.78	16.58	6.87

@ LECO WEIGHT PERCENT SULPHUR

7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - JIGGING TEST

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
#1 CLEAN	60	90	480	10	90	10	400
#1 REFUSE	50	90	540	10	110	10	410
#2 CLEAN	60	100	490	30	90	30	370
#2 REFUSE	50	90	570	10	80	20	370
#3 CLEAN	60	100	480	10	90	10	420
#3 REFUSE	60	100	510	20	60	10	410
#4 CLEAN	60	120	460	20	90	20	400
#4 REFUSE	60	100	520	20	70	10	390
#5 CLEAN	60	90	480	10	90	10	420
#5 REFUSE	50	100	540	10	70	10	350
#6 CLEAN	60	100	490	20	90	10	440
#6 REFUSE	50	90	520	20	80	10	370
#7 CLEAN	60	110	450	20	100	10	400
#7 REFUSE	60	120	490	10	90	20	380
#8 CLEAN	60	100	460	30	90	10	410
#8 REFUSE	60	90	520	20	80	10	350
#9 CLEAN	60	90	470	30	90	20	370
#9 REFUSE	60	90	550	10	70	20	360
#10 CLEAN	60	100	470	20	90	20	400
#10 REFUSE	50	110	570	10	80	20	370

7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - JIGGING TEST

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
#11 CLEAN	60	110	490	20	90	20	380
#11 REFUSE	60	90	520	20	90	20	380
#12 CLEAN	60	100	480	10	90	20	400
#12 REFUSE	60	100	540	30	90	20	360
#13 CLEAN	60	90	490	20	80	10	430
#13 REFUSE	60	90	560	40	80	20	380
#14 CLEAN	60	80	480	20	90	10	430
#14 REFUSE	60	120	550	10	90	<10	370
#15 CLEAN	60	100	490	10	80	30	380
#15 REFUSE	50	90	570	20	80	10	340
#16 CLEAN	60	90	480	20	90	20	420
#16 REFUSE	50	100	580	20	90	10	370
#17 CLEAN	60	100	480	20	80	20	450
#17 REFUSE	60	100	520	20	80	20	380
#18 CLEAN	60	90	480	10	80	20	420
#18 REFUSE	60	100	520	20	90	20	390
#19 CLEAN	60	110	480	20	100	20	410
#19 REFUSE	50	100	550	30	80	10	360
#20 CLEAN	60	100	470	20	110	10	410
#20 REFUSE	60	90	570	20	90	10	390

TABLE 8 : ORGANIC AND CARBONATE RECOVERIES - JIGGING TEST

			ORGANICS IN CLEAN		CARBONATES IN REFUSE	
TEST NO.	CLEAN (wt.%)	REFUSE (wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
TEST # 1	70.50	29.50	69.33	72.60	33.88	33.71
TEST # 2	91.43	8.57	92.95	92.77	10.22	10.28
TEST # 3	28.32	71.68	28.92	29.25	73.33	72.09
TEST # 4	39.44	60.56	38.13	40.10	62.43	63.46
TEST # 5	52.06	47.94	52.52	53.91	52.83	51.75
TEST # 6	58.56	41.44	58.69	59.97	45.50	45.90
TEST # 7	29.64	70.36	30.17	30.93	72.98	71.50
TEST # 8	43.44	56.56	47.01	45.94	63.42	62.45
TEST # 9	70.17	29.83	74.06	71.49	36.57	33.78
TEST # 10	80.53	19.47	84.91	83.56	24.25	24.37
TEST # 11	40.83	59.17	40.83	41.66	64.13	63.25
TEST # 12	48.52	51.48	51.80	51.41	57.53	58.11
TEST # 13	69.96	30.04	71.44	72.34	34.27	33.91
TEST # 14	61.93	38.07	66.81	65.78	42.99	42.57
TEST # 15	81.30	18.70	83.92	85.51	24.14	22.95
TEST # 16	70.09	29.91	73.59	72.18	36.91	35.97
TEST # 17	42.13	57.87	41.15	41.45	58.98	61.05
TEST # 18	37.55	62.45	38.13	36.61	62.27	64.12
TEST # 19	65.40	34.60	66.92	67.31	42.20	40.15
TEST # 20	54.87	45.13	59.62	58.31	54.23	53.64

Figure 1.

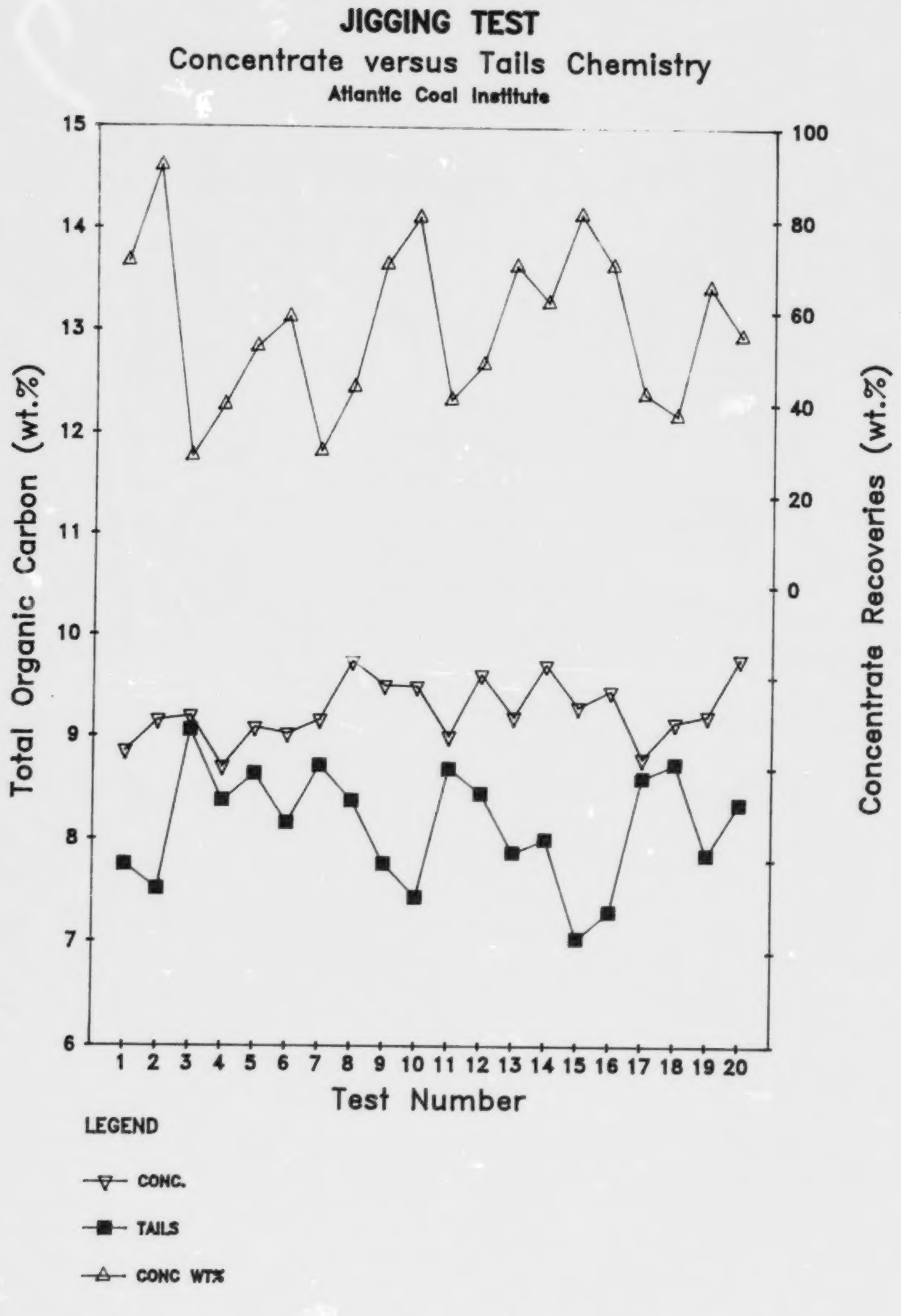
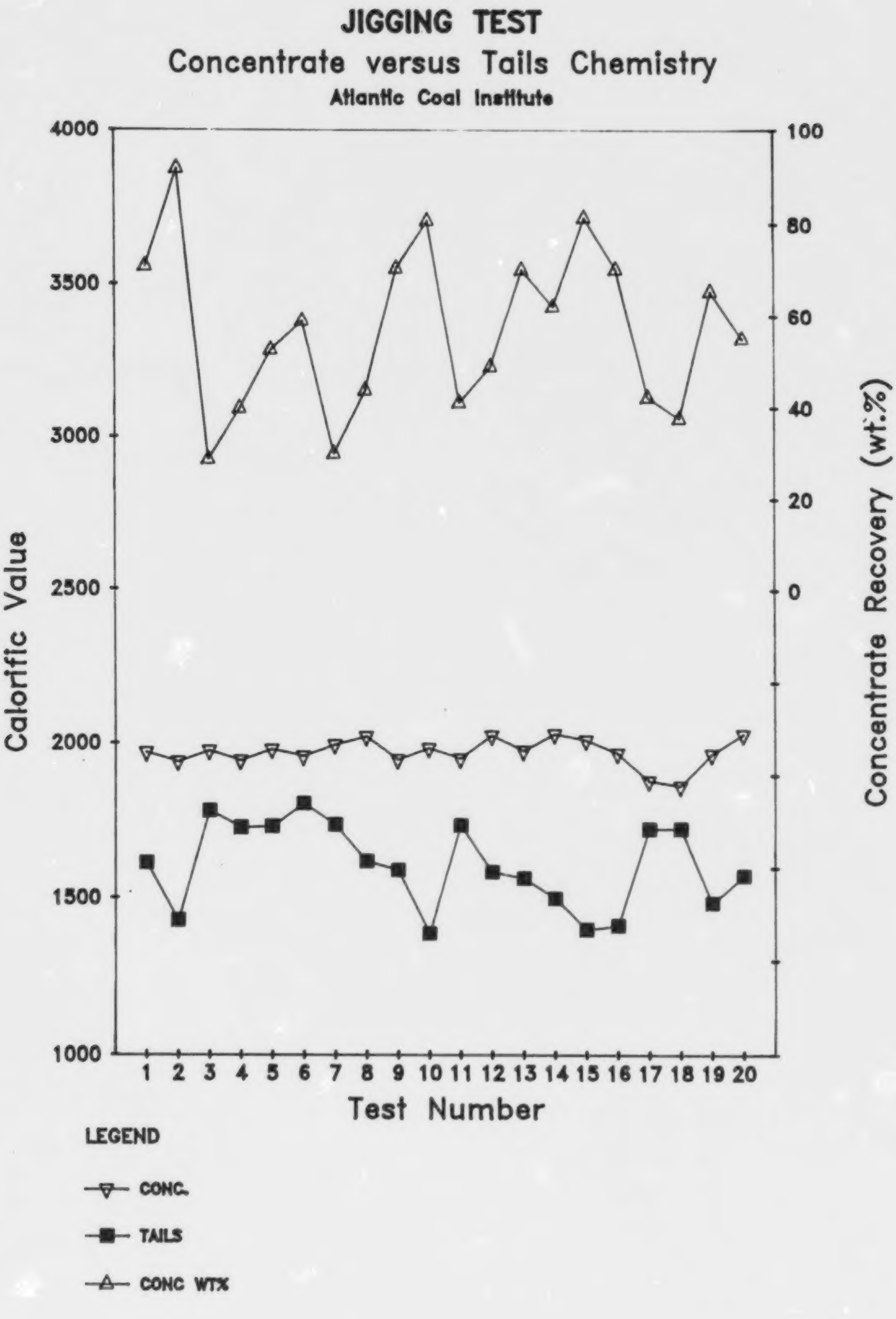

JIGGING TEST
Concentrate versus Tails Chemistry
Atlantic Coal Institute
Total Organic Carbon (wt.%)
15
14
13
12
11
10
9
8
7
6
Concentrate Recoveries (wt.%)
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Test Number
LEGEND
CONC.
TAILS
CONC WT%

Figure 2

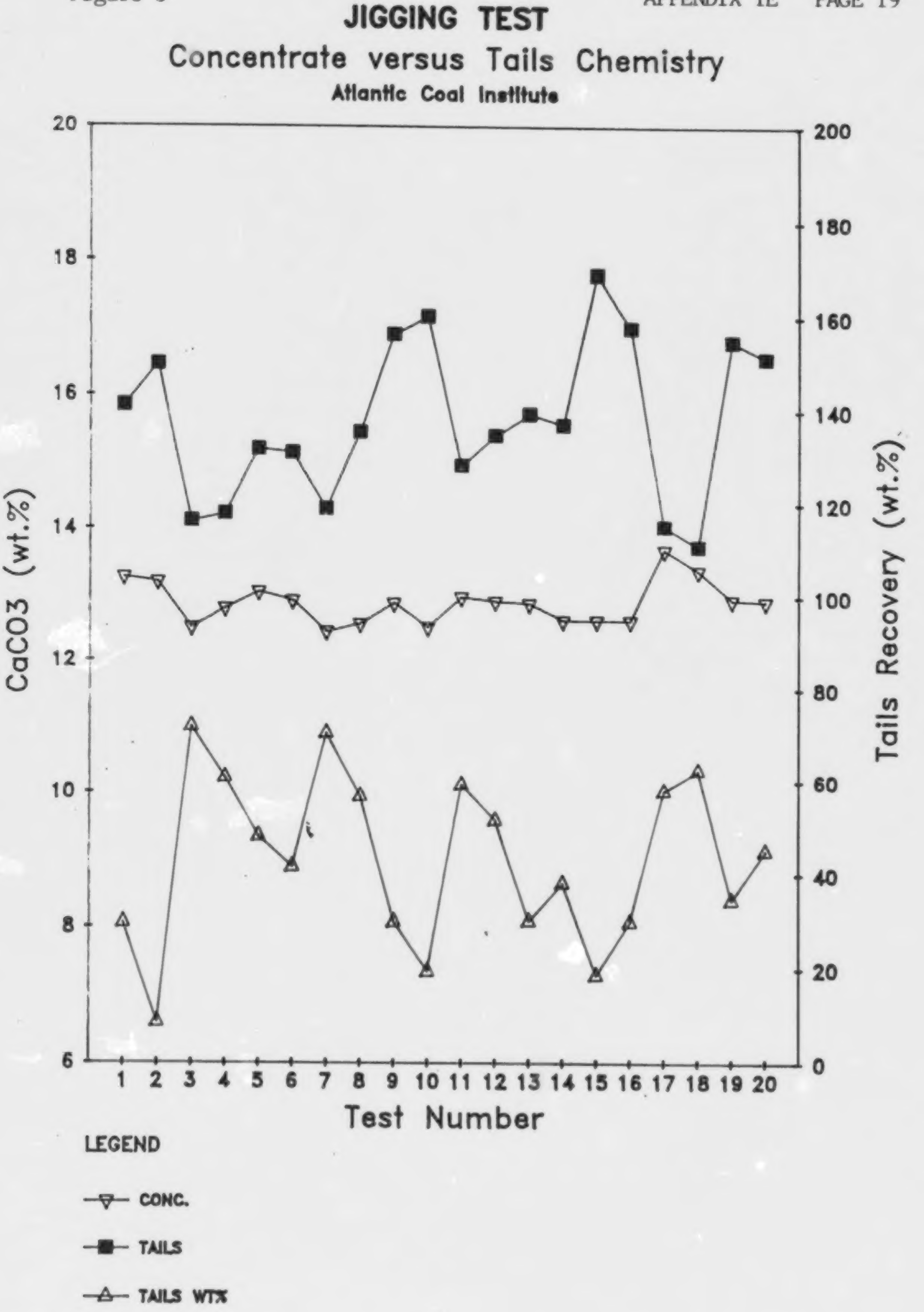


JIGGING TEST

Concentrate versus Tails Chemistry

Atlantic Coal Institute

Figure 3


JIGGING TEST
Concentrate versus Tails Chemistry
Atlantic Coal Institute
CaCO3 (wt.%)
Tails Recovery (wt.%)
Test Number
6
8
10
12
14
16
18
20
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
LEGEND
CONC.
TAILS
TAILS WT%

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ANALYTICAL DATA

F. Froth Flotation

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TABLE 1A : FROTH FLOTATION PARAMETERS AND RECOVERIES -28,- 50 mesh SAMPLES

TEST #	PULP DENSITY (% SOLIDS BY WEIGHT)	FROTHER	COLLECTOR	AERATION RATE	RETENTION TIME	CONCENTRATE (wt.%)	TAILS (wt.%)
1 (-28 mesh)	15.0	AEROFROTH 65 0.1 kg/tonne	XANTHATE 0.05 kg/tonne	2.0 l/min	15 min	12.09	87.91
2 (-28 mesh)	20.0	MIBC 0.5 kg/tonne	NONE	3.0 l/min	15 min	19.00	81.00
3 (-28 mesh)	25.0	MIBC 3.0 kg/tonne	NONE	1.0 l/min	15 min	6.80	93.20
4 (-50 mesh)	10.0	MIBC 0.5 kg/tonne	NONE	2.0 l/min	5 min	7.39	92.61
5 (-50 mesh)	10.0	MIBC 0.5 kg/tonne	DIESEL FUEL 0.5 kg/tonne	2.0 l/min	5 min	12.36	87.64
6 (-50 mesh)	10.0	MIBC 0.5 kg/tonne	DIESEL FUEL 1.0 kg/tonne	2.0 l/min	5 min	10.54	89.46
7 (-50 mesh)	10.0	MIBC 1.0 kg/tonne	AEROFLOAT 31 1.0 kg/tonne	3.0 l/min	10 min	56.65	43.35
8 (-50 mesh)	10.0	CRESYLIC ACID 1.0 kg/tonne	NONE	3.0 l/min	8 min	32.04	67.96
9 (-50 mesh)	10.0	AEROFROTH 65 0.5 kg/tonne	AERODRI 100 0.5 kg/tonne	3.5 l/min	6 min	36.33	63.67
10 (-50 mesh)	10.0	AEROFROTH 65 1.0 kg/tonne	AEROFLOAT 15 1.0 kg/tonne	4.0 l/min	12 min	49.44	50.56

TABLE 1B : FROTH FLOTATION PARAMETERS AND RECOVERIES OF CLEANED -28,- 50 mesh SAMPLES

TEST # (REFLOATED FROM)	PULP DENSITY (% SOLIDS BY WEIGHT)	FROTHER	COLLECTOR	AERATION RATE	RETENTION TIME	CONCENTRATE (wt.%)	TAILS (wt.%)
1 (2 -28 mesh)	3.0	MIBC 1.0 kg/tonne	KEROSENE 1.0 kg/tonne	2.0 l/min	5 min	51.86	48.14
2 (7 -50 mesh)	5.0	MIBC 1.0 kg/tonne	KEROSENE 1.0 kg/tonne	2.0 l/min	5 min	78.39	21.61
3 (8 -50 mesh)	3.0	MIBC 1.0 kg/tonne	DIESEL FUEL 1.0 kg/tonne	2.0 l/min	6 min	67.14	32.86
4 (9 -50 mesh)	3.5	AEROFROTH 65 1.0 kg/tonne	KEROSENE 1.0 kg/tonne	2.5 l/min	4 min	67.76	32.24
5 (10 -50 mesh)	4.5	MIBC 1.0 kg/tonne	KEROSENE 1.0 kg/tonne	4.0 l/min	5 min	92.38	7.62

() INDICATE ORIGINAL FROTH FLOTATION CONCENTRATES REANALYSED

TABLE 2A : FROTH FLOTATION PARAMETERS AND RECOVERIES -200 mesh SAMPLES

TEST #	PULP DENSITY (% SOLIDS BY WEIGHT)	FROTHER	COLLECTOR	AERATION RATE	RETENTION TIME	CONCENTRATE (wt.%)	TAILS (wt.%)
1	10.0	MIBC 0.5 kg/tonne	DIESEL FUEL 0.5 kg/tonne	2.0 l/min	5 min	44.76	55.24
2	15.0	MIBC 0.5 kg/tonne	DIESEL FUEL 1.0 kg/tonne	1.5 l/min	4 min	31.74	68.26
3	15.0	MIBC 0.5 kg/tonne	NONE	2.5 l/min	8 min	48.52	51.48
4	10.0	PINE OIL 0.5 kg/tonne	AEROFLOAT 15 0.5 kg/tonn	2.0 l/min	5 min	90.55	9.45
5	10.0	PINE OIL 0.5 kg/tonne	NONE	2.5 l/min	8 min	65.48	34.52
6	7.5	CRESYLIC ACID 0.5 kg/tonne	DIESEL FUEL 0.5 kg/tonne	2.0 l/min	5 min	35.79	64.21
7	10.0	MIBC 1.0 kg/tonne	AEROFLOAT 15 0.5 kg/tonn	2.5 l/min	4 min	90.33	9.67
8	10.0	MIBC 0.5 kg/tonne	NONE	2.0 l/min	5 min	35.54	64.46
9	10.0	MIBC 0.5 kg/tonne	DIESEL FUEL 1.0 kg/tonne	2.0 l/min	5 min	46.30	53.70
10	10.0	MIBC 0.5 kg/tonne	DIESEL FUEL 1.5 kg/tonne	2.0 l/min	5 min	45.25	54.75

TABLE 2B : FROTH FLOTATION PARAMETERS AND RECOVERIES OF CLEANED -200 mesh SAMPLES

TEST #	PULP DENSITY (% SOLIDS BY WEIGHT)	FROTHER	COLLECTOR	AERATION RATE	RETENTION TIME	CONCENTRATE (wt.%)	TAILS (wt.%)
1 (3)	6.0	MIBC 1.0 kg/tonne	KEROSENE 0.5 kg/tonne	3.0 l/mi	5 min	90.21	9.79
2 (5)	6.0	AEROFROTH 65 0.5 kg/tonne	KEROSENE 0.5 kg/tonne	2.0 l/mi	5 min	71.54	28.46
3 (6)	3.0	MIBC 1.0 kg/tonne	DIESEL FUEL 1.0 kg/tonne	2.0 l/mi	3 min	75.92	24.08
4 (9)	4.0	AEROFROTH 65 1.0 kg/tonne	DIESEL FUEL 1.0 kg/tonne	2.0 l/mi	5 min	79.50	20.50
5 (10)	4.0	MIBC 2.0 kg/tonne	KEROSENE 4.0 kg/tonne	2.0 l/mi	5 min	92.31	7.69

() INDICATE ORIGINAL FROTH FLOTATION CONCENTRATES REANALYSED

TABLE 3 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS -28,50 mesh FLOTATION TESTS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.	CALORIFIC* VALUE BTU/lb
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	
-28 mesh								
#1 CONC.	0.00	8.93	95.33	441	11.93	0.09	799	2461
#1 TAILS	0.00	8.43	79.41	441	9.82	0.10	809	1989
#2 CONC.	0.00	8.31	92.40	441	11.63	0.08	794	2332
#2 TAILS	0.00	7.36	73.88	441	9.39	0.09	787	1901
#3 CONC.	0.00	5.33	91.00	443	11.72	0.06	776	2756
#3 TAILS	0.00	5.67	69.67	441	8.97	0.08	777	1977
-50 mesh								
#4 CONC.	0.00	10.19	99.27	443	12.71	0.09	781	2871
#4 TAILS	0.00	7.36	70.85	442	9.16	0.09	773	1884
#5 CONC.	0.00	8.27	106.15	444	13.20	0.07	804	3105
#5 TAILS	0.00	6.38	69.80	442	8.99	0.08	776	1831
#6 CONC.	0.00	7.54	118.01	445	14.51	0.06	813	3381
#6 TAILS	0.00	6.51	67.69	442	8.73	0.09	775	1791
#7 CONC.	0.00	7.87	81.80	440	10.22	0.09	800	2202
#7 TAILS	0.00	7.83	71.71	439	9.05	0.10	792	1775
#8 CONC.	0.00	9.11	88.63	439	11.26	0.09	787	2489
#8 TAILS	0.00	7.40	69.13	440	8.98	0.10	770	1843
#9 CONC.	0.00	8.80	86.80	443	10.42	0.09	833	2291
#9 TAILS	0.00	7.61	70.79	442	8.94	0.10	792	1845
#10 CONC.	0.00	7.77	82.22	443	10.08	0.09	816	2059
#10 TAILS	0.00	7.25	73.85	441	9.08	0.09	813	1801

* NOT CORRECTED FOR SULPHUR

TABLE 3 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS - FROTH FLOTATION TESTS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.	CALORIFIC* VALUE
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	
-200 mesh								
#1 CONC.	0.00	7.91	77.65	441	9.85	0.09	788	2078
#1 TAILS	0.00	6.79	67.56	442	8.50	0.09	795	1714
#2 CONC.	0.00	8.42	80.46	441	10.52	0.09	765	2224
#2 TAILS	0.00	6.90	67.23	441	8.60	0.09	782	1847
#3 CONC.	0.00	6.68	80.59	438	10.14	0.08	795	2122
#3 TAILS	0.00	5.83	71.14	441	8.58	0.08	829	1706
#4 CONC.	0.00	7.37	77.93	439	9.61	0.09	811	1960
#4 TAILS	0.00	5.62	59.80	439	7.74	0.09	773	1454
#5 CONC.	0.00	8.07	84.16	440	10.37	0.09	812	2210
#5 TAILS	0.00	4.64	52.70	439	6.71	0.08	785	1451
#6 CONC.	0.00	5.39	72.23	439	9.60	0.07	752	2129
#6 TAILS	0.00	4.80	63.50	440	7.96	0.07	798	1681
#7 CONC.	0.00	7.16	71.29	441	9.08	0.09	785	1948
#7 TAILS	0.00	5.32	51.73	438	6.99	0.09	740	1401
#8 CONC.	0.00	7.10	74.53	438	9.68	0.09	770	2218
#8 TAILS	0.00	6.55	67.48	442	8.34	0.09	809	1748
#9 CONC.	0.00	7.18	76.53	440	9.81	0.09	780	2222
#9 TAILS	0.00	4.87	59.06	443	7.50	0.08	787	1648
#10 CONC.	0.00	5.49	72.58	441	9.33	0.07	778	2097
#10 TAILS	0.00	4.24	62.34	441	7.95	0.06	784	1620

* NOT CORRECTED FOR SULPHUR

TABLE 4 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS - REFLOTATION TESTS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.	CALORIFIC* VALUE
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	
-28 mesh								
#2 CONC.	0.00	7.67	96.38	444	11.74	0.07	821	2834
#2 TAILS	0.00	6.38	72.25	441	9.10	0.08	794	2027
-50 mesh								
#7 CONC.	0.00	7.31	82.43	442	10.16	0.08	811	2167
#7 TAILS	0.00	5.94	74.68	442	9.23	0.07	809	1771
#8 CONC.	0.00	9.45	98.43	443	12.01	0.09	820	2828
#8 TAILS	0.00	6.14	68.62	441	8.59	0.08	799	1857
#9 CONC.	0.00	7.60	92.60	443	11.10	0.08	834	2461
#9 TAILS	0.00	6.45	74.45	442	9.19	0.08	810	2003
#10 CONC.	0.00	6.81	82.80	442	10.01	0.08	827	2220
#10 TAILS	0.00	7.89	100.82	443	11.72	0.07	860	2128
-200 mesh								
#3 CONC.	0.00	6.66	76.40	441	9.69	0.08	788	2181
#3 TAILS	0.00	6.34	62.56	438	8.24	0.09	759	1684
#5 CONC.	0.00	7.70	84.39	441	10.53	0.08	801	2271
#5 TAILS	0.06	5.51	67.33	440	8.51	0.08	791	1832
#6 CONC.	0.06	6.23	78.11	439	10.14	0.07	770	2187
#6 TAILS	0.00	6.27	71.18	438	9.42	0.08	756	1989
#9 CONC.	0.06	8.26	83.26	440	10.57	0.09	788	2358
#9 TAILS	0.06	7.21	67.55	438	8.78	0.10	769	1836
#10 CONC.	0.06	6.06	78.20	439	9.82	0.07	796	2145
#10 TAILS	0.06	6.51	74.49	438	9.46	0.08	787	2040

* NOT CORRECTED FOR SULPHUR

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - FLOTATION TESTS

SAMPLE I.D.	SiO2 wt%	Al2O3 wt%	TiO2 wt%	Fe2O3 wt%	MnO wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	LOI wt%	TOTAL MAJORS
-28 mesh												
#1 CONC.	43.5	11.6	0.60	5.04	0.09	2.50	6.96	1.33	1.97	0.64	24.7	98.9
#1 TAILS	44.0	12.1	0.60	5.03	0.10	2.86	7.98	1.28	2.09	0.56	22.6	99.2
#2 CONC.	44.4	11.8	0.60	4.97	0.09	2.55	7.06	1.44	1.99	0.63	24.1	99.6
#2 TAILS	43.9	12.1	0.60	4.98	0.10	2.83	7.96	1.31	2.11	0.56	22.5	99.0
#3 CONC.	43.1	11.9	0.62	4.89	0.10	2.53	6.81	1.17	2.06	0.65	25.9	99.7
#3 TAILS	44.2	12.1	0.60	4.99	0.10	2.83	7.98	1.36	2.09	0.57	22.4	99.2
-50 mesh												
#4 CONC.	42.5	11.5	0.61	4.89	0.10	2.59	6.98	1.29	1.98	0.66	26.8	99.9
#4 TAILS	44.1	12.1	0.60	4.98	0.10	2.79	7.78	1.32	2.11	0.56	22.4	98.8
#5 CONC.	42.5	11.2	0.59	4.66	0.09	2.54	7.04	1.36	1.92	0.70	27.2	99.8
#5 TAILS	44.5	12.2	0.60	5.02	0.10	2.85	7.83	1.32	2.12	0.56	22.1	99.2
#6 CONC.	41.6	11.0	0.58	4.57	0.09	2.51	6.98	1.36	1.89	0.72	28.8	100.1
#6 TAILS	44.3	12.2	0.60	5.02	0.10	2.85	7.86	1.28	2.14	0.55	22.1	99.0
#7 CONC.	44.7	12.0	0.60	4.88	0.10	2.67	7.43	1.37	2.04	0.60	23.3	99.7
#7 TAILS	43.6	12.1	0.61	5.09	0.10	3.02	8.34	1.28	2.14	0.56	22.2	99.0
#8 CONC.	44.7	11.9	0.60	4.82	0.10	2.64	7.23	1.38	1.97	0.64	24.3	100.3
#8 TAILS	43.9	12.2	0.60	4.96	0.10	2.85	7.86	1.24	2.15	0.54	22.2	98.6
#9 CONC.	43.9	11.7	0.58	4.74	0.09	2.64	7.62	1.41	1.99	0.60	23.8	99.1
#9 TAILS	43.9	12.2	0.61	5.04	0.10	2.94	7.84	1.28	2.15	0.55	22.1	98.7
#10 CONC.	44.6	12.0	0.60	4.83	0.10	2.63	7.29	1.40	2.06	0.60	23.0	99.1
#10 TAILS	43.3	12.0	0.60	4.99	0.10	2.94	8.08	1.29	2.14	0.56	22.5	98.5

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - FLOTATION TESTS

SAMPLE I.D.	SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	LOI wt%	TOTAL MAJORS
-200 mesh												
#1 CONC.	44.5	12.2	0.63	5.32	0.10	2.72	7.32	1.34	2.10	0.55	22.8	99.6
#1 TAILS	44.7	12.3	0.59	5.01	0.10	2.62	8.05	1.27	2.11	0.50	21.3	98.6
#2 CONC.	44.0	12.1	0.64	5.36	0.10	2.71	7.20	1.30	2.11	0.57	23.4	99.5
#2 TAILS	44.7	12.2	0.59	4.99	0.10	2.63	7.98	1.31	2.12	0.50	21.4	98.5
#3 CONC.	44.0	12.3	0.64	5.24	0.10	2.66	7.09	1.34	2.14	0.55	22.9	99.0
#3 TAILS	45.1	12.2	0.59	5.02	0.10	2.62	8.35	1.33	2.10	0.50	21.4	99.3
#4 CONC.	44.6	12.1	0.61	5.09	0.10	2.65	7.74	1.36	2.09	0.54	22.1	99.0
#4 TAILS	44.5	13.0	0.62	5.05	0.11	2.66	8.20	1.06	2.30	0.44	20.2	98.1
#5 CONC.	44.2	12.1	0.62	5.09	0.10	2.62	7.19	1.36	2.09	0.56	22.9	98.8
#5 TAILS	44.8	12.4	0.59	5.15	0.10	2.66	8.76	1.23	2.13	0.45	20.3	98.6
#6 CONC.	44.5	12.3	0.64	5.36	0.10	2.72	7.09	1.30	2.13	0.56	23.3	100.0
#6 TAILS	44.8	12.2	0.59	4.96	0.10	2.60	8.17	1.32	2.09	0.50	21.5	98.8
#7 CONC.	44.8	12.2	0.61	5.11	0.10	2.67	7.67	1.35	2.09	0.54	22.7	99.8
#7 TAILS	44.6	13.0	0.62	5.62	0.11	2.65	8.82	1.07	2.29	0.43	20.0	99.2
#8 CONC.	44.2	12.3	0.65	5.43	0.10	2.71	7.15	1.31	2.13	0.56	23.8	100.3
#8 TAILS	44.9	12.2	0.59	4.99	0.10	2.62	8.05	1.37	2.10	0.51	21.6	99.0
#9 CONC.	44.5	12.2	0.64	5.23	0.10	2.67	7.34	1.33	2.09	0.57	23.3	100.0
#9 TAILS	45.3	12.4	0.60	5.15	0.10	2.67	8.39	1.30	2.06	0.48	21.2	99.6
#10 CONC.	44.3	12.3	0.64	5.34	0.10	2.68	7.29	1.34	2.12	0.57	23.4	100.1
#10 TAILS	44.8	12.3	0.59	5.04	0.10	2.63	8.29	1.30	2.11	0.49	21.3	99.0

TABLE 6 : XRF WHOLE ROCK ANALYSIS - FLOTATION TESTS - MAJOR ELEMENTS AND CARBONATES CALCULATED

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	CaCO3 wt.%	MgCO3 wt.%
-28 mesh												
#1 CONC.	20.3	6.14	0.36	3.5	0.070	1.51	5.0	0.99	1.6	0.28	12.42	5.23
#1 TAILS	20.6	6.41	0.36	3.5	0.077	1.72	5.7	0.95	1.7	0.24	14.24	5.98
#2 CONC.	20.8	6.25	0.36	3.5	0.070	1.54	5.0	1.07	1.7	0.27	12.60	5.34
#2 TAILS	20.5	6.41	0.36	3.5	0.077	1.71	5.7	0.97	1.8	0.24	14.21	5.92
#3 CONC.	20.1	6.30	0.37	3.4	0.077	1.53	4.9	0.87	1.7	0.28	12.15	5.29
#3 TAILS	20.7	6.41	0.36	3.5	0.077	1.71	5.7	1.01	1.7	0.25	14.24	5.92
-50 mesh												
#4 CONC.	19.9	6.09	0.37	3.4	0.077	1.56	5.0	0.96	1.6	0.29	12.46	5.42
#4 TAILS	20.6	6.41	0.36	3.5	0.077	1.68	5.6	0.98	1.8	0.24	13.89	5.84
#5 CONC.	19.9	5.93	0.35	3.3	0.070	1.53	5.0	1.01	1.6	0.31	12.57	5.31
#5 TAILS	20.8	6.46	0.36	3.5	0.077	1.72	5.6	0.98	1.8	0.24	13.98	5.96
#6 CONC.	19.4	5.82	0.35	3.2	0.070	1.51	5.0	1.01	1.6	0.31	12.46	5.25
#6 TAILS	20.7	6.46	0.36	3.5	0.077	1.72	5.6	0.95	1.8	0.24	14.03	5.96
#7 CONC.	20.9	6.35	0.36	3.4	0.077	1.61	5.3	1.02	1.7	0.26	13.26	5.59
#7 TAILS	20.4	6.41	0.37	3.6	0.077	1.82	6.0	0.95	1.8	0.24	14.89	6.32
#8 CONC.	20.9	6.30	0.36	3.4	0.077	1.59	5.2	1.02	1.6	0.28	12.90	5.52
#8 TAILS	20.5	6.46	0.36	3.5	0.077	1.72	5.6	0.92	1.8	0.24	14.03	5.96
#9 CONC.	20.5	6.19	0.35	3.3	0.070	1.59	5.4	1.05	1.7	0.26	13.60	5.52
#9 TAILS	20.5	6.46	0.37	3.5	0.077	1.77	5.6	0.95	1.8	0.24	13.99	6.15
#10 CONC.	20.9	6.35	0.36	3.4	0.077	1.59	5.2	1.04	1.7	0.26	13.01	5.50
#10 TAILS	20.2	6.35	0.36	3.5	0.077	1.77	5.8	0.96	1.8	0.24	14.42	6.15

TABLE 6 : XRF WHOLE ROCK ANALYSIS - FLOTATION TESTS - MAJOR ELEMENTS AND CARBONATES CALCULATED

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	CaCO3 wt.%	MgCO3 wt.%
-200 mesh												
#1 CONC.	20.8	6.46	0.38	3.7	0.077	1.64	5.2	0.99	1.7	0.24	13.07	5.69
#1 TAILS	20.9	6.51	0.35	3.5	0.077	1.58	5.8	0.94	1.8	0.22	14.37	5.48
#2 CONC.	20.6	6.41	0.38	3.7	0.077	1.63	5.1	0.96	1.8	0.25	12.85	5.67
#2 TAILS	20.9	6.46	0.35	3.5	0.077	1.59	5.7	0.97	1.8	0.22	14.24	5.50
#3 CONC.	20.6	6.51	0.38	3.7	0.077	1.60	5.1	0.99	1.8	0.24	12.65	5.57
#3 TAILS	21.1	6.46	0.35	3.5	0.077	1.58	6.0	0.99	1.7	0.22	14.90	5.48
#4 CONC.	20.9	6.41	0.37	3.6	0.077	1.60	5.5	1.01	1.7	0.24	13.81	5.54
#4 TAILS	20.8	6.88	0.37	3.5	0.085	1.60	5.9	0.79	1.9	0.19	14.64	5.57
#5 CONC.	20.7	6.41	0.37	3.6	0.077	1.58	5.1	1.01	1.7	0.24	12.83	5.48
#5 TAILS	20.9	6.58	0.35	3.6	0.077	1.60	6.3	0.91	1.8	0.20	15.64	5.57
#6 CONC.	20.8	6.51	0.38	3.7	0.077	1.64	5.1	0.96	1.8	0.24	12.65	5.69
#6 TAILS	20.9	6.46	0.35	3.5	0.077	1.57	5.8	0.98	1.7	0.22	14.58	5.44
#7 CONC.	20.9	6.46	0.37	3.6	0.077	1.61	5.5	1.00	1.7	0.24	13.69	5.59
#7 TAILS	20.9	6.88	0.37	3.9	0.085	1.60	6.3	0.79	1.9	0.19	15.74	5.54
#8 CONC.	20.7	6.51	0.39	3.8	0.077	1.63	5.1	0.97	1.8	0.24	12.76	5.67
#8 TAILS	21.0	6.46	0.35	3.5	0.077	1.58	5.8	1.02	1.7	0.22	14.37	5.48
#9 CONC.	20.8	6.46	0.38	3.7	0.077	1.61	5.2	0.99	1.7	0.25	13.10	5.59
#9 TAILS	21.2	6.56	0.36	3.6	0.077	1.61	6.0	0.96	1.7	0.21	14.97	5.59
#10 CONC.	20.7	6.51	0.38	3.7	0.077	1.62	5.2	0.99	1.8	0.25	13.01	5.61
#10 TAILS	20.9	6.51	0.35	3.5	0.077	1.59	5.9	0.96	1.8	0.21	14.80	5.50

TABLE 7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - FLOTATION TESTS

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
-28 mesh							
#1 CONC.	70	100	470	<10	110	10	420
#1 TAILS	60	110	490	10	80	10	420
#2 CONC.	70	90	460	10	110	20	470
#2 TAILS	60	100	500	30	80	20	400
#3 CONC.	70	100	460	20	90	20	460
#3 TAILS	60	110	480	30	100	10	410
-50 mesh							
#4 CONC.	60	100	500	10	90	20	440
#4 TAILS	60	100	470	10	90	20	410
#5 CONC.	50	110	510	20	80	10	420
#5 TAILS	60	110	470	20	90	20	410
#6 CONC.	60	100	520	20	90	10	430
#6 TAILS	50	100	490	30	90	10	390
#7 CONC.	60	100	480	<10	90	20	410
#7 TAILS	50	90	510	30	90	10	430
#8 CONC.	60	100	500	10	100	10	420
#8 TAILS	60	130	480	20	90	10	410
#9 CONC.	60	100	500	30	90	20	400
#9 TAILS	50	100	470	10	90	10	410
#10 CONC.	60	110	470	20	90	10	440
#10 TAILS	50	100	490	30	100	20	410

TABLE 7 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - FLOTATION TESTS

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
-200 mesh							
#1 CONC.	60	110	480	20	90	20	420
#1 TAILS	50	110	460	50	90	10	420
#2 CONC.	60	100	460	20	90	30	460
#2 TAILS	50	100	440	20	80	20	420
#3 CONC.	60	110	450	30	90	10	450
#3 TAILS	50	90	460	20	90	10	430
#4 CONC.	60	100	480	30	90	20	430
#4 TAILS	60	100	420	20	80	10	440
#5 CONC.	60	110	460	10	90	10	420
#5 TAILS	50	110	470	10	90	10	400
#6 CONC.	60	110	460	30	100	10	450
#6 TAILS	50	100	470	30	90	20	420
#7 CONC.	60	100	470	30	100	20	440
#7 TAILS	60	110	430	10	90	10	440
#8 CONC.	60	100	470	10	110	20	450
#8 TAILS	50	110	460	30	90	10	430
#9 CONC.	60	110	460	10	100	10	440
#9 TAILS	50	100	470	30	90	20	410
#10 CONC.	60	110	480	20	90	10	450
#10 TAILS	50	100	470	20	80	10	420

TABLE 8 : XRF WHOLE ROCK ANALYSIS - MAJOR OXIDES - REFLOTATION

SAMPLE I.D.	SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	LOI wt%	TOTAL MAJORS
-28 mesh												
#2 CONC.	43.2	11.2	0.59	4.81	0.09	2.46	7.12	1.40	1.90	0.70	26.0	99.5
#2 TAILS	45.1	12.5	0.62	5.10	0.10	2.59	6.90	1.33	2.13	0.57	22.7	99.6
-50 mesh												
#7 CONC.	44.8	11.9	0.60	4.89	0.10	2.62	7.35	1.45	1.99	0.62	23.5	99.8
#7 TAILS	43.9	12.5	0.61	4.91	0.10	2.74	7.55	1.24	2.20	0.54	22.7	99.0
#8 CONC.	43.3	11.3	0.58	4.70	0.09	2.52	7.02	1.41	1.93	0.68	26.2	99.7
#8 TAILS	45.2	12.5	0.62	4.98	0.10	2.71	7.11	1.39	2.15	0.54	22.1	99.4
#9 CONC.	43.9	11.4	0.58	4.71	0.09	2.62	7.67	1.46	1.91	0.64	24.8	99.8
#9 TAILS	44.6	12.4	0.61	5.00	0.10	2.70	7.54	1.34	2.12	0.55	22.6	99.6
#10 CONC.	44.5	12.0	0.59	4.84	0.10	2.62	7.33	1.38	2.03	0.60	23.2	99.2
#10 TAILS	*											
-200 mesh												
#3 CONC.	44.7	12.3	0.64	5.34	0.10	2.69	7.23	1.32	2.06	0.57	23.5	100.5
#3 TAILS	44.9	13.7	0.67	5.39	0.10	2.71	6.92	1.09	2.46	0.48	21.1	99.5
#5 CONC.	44.0	11.8	0.61	5.10	0.10	2.64	7.27	1.43	2.02	0.59	23.8	99.4
#5 TAILS	45.9	13.1	0.65	5.28	0.10	2.67	7.11	1.30	2.23	0.51	21.6	100.5
#6 CONC.	44.0	12.0	0.64	5.51	0.10	2.78	7.34	1.32	2.03	0.58	24.0	100.3
#6 TAILS	44.8	13.1	0.67	5.35	0.10	2.66	6.59	1.25	2.30	0.53	22.8	100.1
#9 CONC.	44.2	11.9	0.62	5.25	0.10	2.70	7.33	1.37	2.01	0.59	23.8	99.9
#9 TAILS	45.1	13.2	0.67	5.41	0.10	2.66	6.74	1.21	2.33	0.50	21.8	99.7
#10 CONC.	44.6	12.2	0.63	5.32	0.10	2.71	7.33	1.38	2.06	0.57	23.0	99.9
#10 TAILS	*											

* INSUFFICIENT SAMPLE

TABLE 9 : XRF WHOLE ROCK ANALYSIS - REFLOTATION - MAJOR ELEMENTS AND CARBONATES CALCULATED

SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	CaCO3 wt.%	MgCO3 wt.%
-28 mesh												
#2 CONC.	20.2	5.93	0.35	3.4	0.070	1.48	5.1	1.04	1.6	0.31	12.71	5.15
#2 TAILS	21.1	6.62	0.37	3.6	0.077	1.56	4.9	0.99	1.8	0.25	12.32	5.42
-50 mesh												
#7 CONC.	20.9	6.30	0.36	3.4	0.077	1.58	5.3	1.08	1.7	0.27	13.12	5.48
#7 TAILS	20.5	6.62	0.37	3.4	0.077	1.65	5.4	0.92	1.8	0.24	13.48	5.73
#8 CONC.	20.2	5.98	0.35	3.3	0.070	1.52	5.0	1.05	1.6	0.30	12.53	5.27
#8 TAILS	21.1	6.62	0.37	3.5	0.077	1.63	5.1	1.03	1.8	0.24	12.70	5.67
#9 CONC.	20.5	6.03	0.35	3.3	0.070	1.58	5.5	1.08	1.6	0.28	13.70	5.48
#9 TAILS	20.9	6.56	0.37	3.5	0.077	1.63	5.4	0.99	1.8	0.24	13.46	5.65
#10 CONC.	20.8	6.35	0.35	3.4	0.077	1.58	5.2	1.02	1.7	0.26	13.08	5.48
#10 TAILS	*											
-200 mesh												
#3 CONC.	20.9	6.51	0.38	3.7	0.077	1.62	5.2	0.98	1.7	0.25	12.90	5.63
#3 TAILS	21.0	7.25	0.40	3.8	0.077	1.63	4.9	0.81	2.0	0.21	12.35	5.67
#5 CONC.	20.6	6.25	0.37	3.6	0.077	1.59	5.2	1.06	1.7	0.26	12.98	5.52
#5 TAILS	21.5	6.93	0.39	3.7	0.077	1.61	5.1	0.96	1.9	0.22	12.69	5.59
#6 CONC.	20.6	6.35	0.38	3.9	0.077	1.68	5.2	0.98	1.7	0.25	13.10	5.82
#6 TAILS	20.9	6.93	0.40	3.7	0.077	1.60	4.7	0.93	1.9	0.23	11.76	5.57
#9 CONC.	20.7	6.30	0.37	3.7	0.077	1.63	5.2	1.02	1.7	0.26	13.08	5.65
#9 TAILS	21.1	6.99	0.40	3.8	0.077	1.60	4.8	0.90	1.9	0.22	12.03	5.57
#10 CONC.	20.9	6.46	0.38	3.7	0.077	1.63	5.2	1.02	1.7	0.25	13.08	5.67
#10 TAILS	*											

* INSUFFICIENT SAMPLE

TABLE 10 : XRF WHOLE ROCK ANALYSIS - ADDITIONAL ELEMENTS - REFLOTATION TESTS

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
-28 mesh							
#2 CONC.	60	100	500	30	100	10	380
#2 TAILS	60	120	460	30	80	20	490
-50 mesh							
#7 CONC.	50	110	500	20	90	20	440
#7 TAILS	60	100	480	20	80	<10	430
#8 CONC.	60	100	510	20	100	10	430
#8 TAILS	60	100	460	20	80	20	470
#9 CONC.	60	110	500	10	100	20	430
#9 TAILS	60	110	480	10	80	20	450
#10 CONC.	60	110	470	20	90	20	420
#10 TAILS							
-200 mesh							
#3 CONC.	60	120	470	40	110	20	420
#3 TAILS	60	130	410	<10	90	10	510
#5 CONC.	50	100	480	20	100	10	400
#5 TAILS	60	120	440	10	100	10	470
#6 CONC.	60	110	480	<10	110	20	440
#6 TAILS	60	120	420	10	80	10	490
#9 CONC.	60	100	480	20	100	10	420
#9 TAILS	60	120	440	30	90	10	500
#10 CONC.	60	110	480	30	90	10	450
#10 TAILS							

* INSUFFICIENT SAMPLE

TABLE 11 : ORGANIC AND CARBONATE RECOVERIES - FROTH FLOTATION -28,-50 mesh

			ORGANICS IN CLEAN		CARBONATES IN REFUSE	
TEST NO.	CONC. (wt.%)	TAILS (wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
TEST #1 (-28 mesh)	12.09	87.91	16.01	15.42	90.73	88.41
TEST #2 (-28 mesh)	19.00	81.00	24.52	22.97	83.39	80.61
TEST #3 (-28 mesh)	6.80	93.20	8.85	9.72	96.19	92.75
TEST #4 (-50 mesh)	7.39	92.61	10.42	11.00	93.19	90.86
TEST #5 (-50 mesh)	12.36	87.64	18.11	19.90	88.75	87.83
TEST #6 (-50 mesh)	10.54	89.46	16.97	18.47	90.94	89.66
TEST #7 (-50 mesh)	56.65	43.35	64.26	64.67	46.76	46.04
TEST #8 (-50 mesh)	32.04	67.96	40.04	41.34	69.09	68.11
TEST #9 (-50 mesh)	36.33	63.67	42.02	43.15	64.56	65.82
TEST #10(-50 mesh)	49.44	50.56	55.31	52.77	52.84	52.27

TABLE 12 : ORGANIC AND CARBONATE RECOVERIES -FROTH FLOTATION -200 mesh

			ORGANICS IN CLEAN		CARBONATES IN REFUSE	
TEST NO.	CONC. (wt.%)	TAILS (wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
TEST #1	44.76	55.24	48.93	48.22	57.51	50.89
TEST #2	31.74	68.26	37.06	36.59	70.45	63.13
TEST #3	48.52	51.48	54.61	53.37	55.60	47.43
TEST #4	90.55	9.45	96.58	92.01	10.02	8.84
TEST #5	65.48	34.52	75.36	75.02	39.11	32.29
TEST #6	35.79	64.21	38.13	39.50	67.85	58.71
TEST #7	90.33	9.67	91.03	91.22	11.03	9.01
TEST #8	35.54	64.46	38.18	40.86	67.11	59.39
TEST #9	46.30	53.70	50.36	53.33	58.27	50.42
TEST #10	45.25	54.75	46.86	49.19	58.70	50.63

TABLE 13 : ORGANIC AND CARBONATE RECOVERIES -FROTH RELOTATION*

			ORGANICS IN CLEAN		CARBONATES IN REFUSE	
TEST NO.	CONC. (wt.%)	TAILS (wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
REFLT 2 -28 mesh	51.86	48.14	52.35	59.72	47.05	48.90
REFLT 7 -50 mesh	78.39	21.61	77.93	77.14	21.96	22.18
REFLT 8 -50 mesh	67.14	32.86	71.61	76.28	32.31	33.73
REFLT 9 -50 mesh	67.76	32.24	72.18	72.79	31.90	32.97
REFLT 10 -50 mesh	92.38	7.62	91.74	99.60		
REFLT 3 -200 mesh	90.21	9.79	86.21	92.72	9.56	9.97
REFLT 5 -200 mesh	71.54	28.46	72.64	73.51	28.14	29.00
REFLT 6 -200 mesh	75.92	24.08	80.19	77.99	22.38	23.55
REFLT 9 -200 mesh	79.50	20.50	85.66	84.37	18.82	20.42
REFLT 10 -200 mesh	92.31	7.69	97.16	94.42		

* CALCULATED FROM ORIGINAL FROTH FLOTATION SAMPLE

TABLE 14 * ORGANIC AND CARBONATE RECOVERIES - FROTH REFLOTATION - RECALCULATED TO BULK SAMPLE

			ORGANICS IN CLEAN		CARBONATES IN REFUSE	
TEST NO.	CONC. (wt.%)	TAILS (wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	$CaCO_3$ RECOVERY	$MgCO_3$ RECOVERY
REFLT 2 -28 mesh	9.85	9.15	12.84	14.48	8.16	8.33
REFLT 7 -50 mesh	44.41	12.24	50.08	49.89	11.95	11.80
REFLT 8 -50 mesh	21.51	10.53	28.67	31.54	9.68	10.03
REFLT 9 -50 mesh	24.62	11.71	30.33	31.41	11.42	11.12
REFLT 10 -50 mesh	45.67	3.77	50.74	52.56		
REFLT 3 -200 mesh	43.77	4.75	47.07	49.49	4.25	4.53
REFLT 5 -200 mesh	46.84	18.64	54.75	55.15	17.14	17.50
REFLT 6 -200 mesh	27.17	8.62	30.58	30.81	7.35	8.06
REFLT 9 -200 mesh	36.81	9.49	43.18	44.99	8.27	8.88
REFLT 10 -200 mesh	41.77	3.48	45.53	46.45		

* CONCENTRATE AND TAILS RECOVERIES RECALCULATED TO BULK SAMPLE

Figure 1.

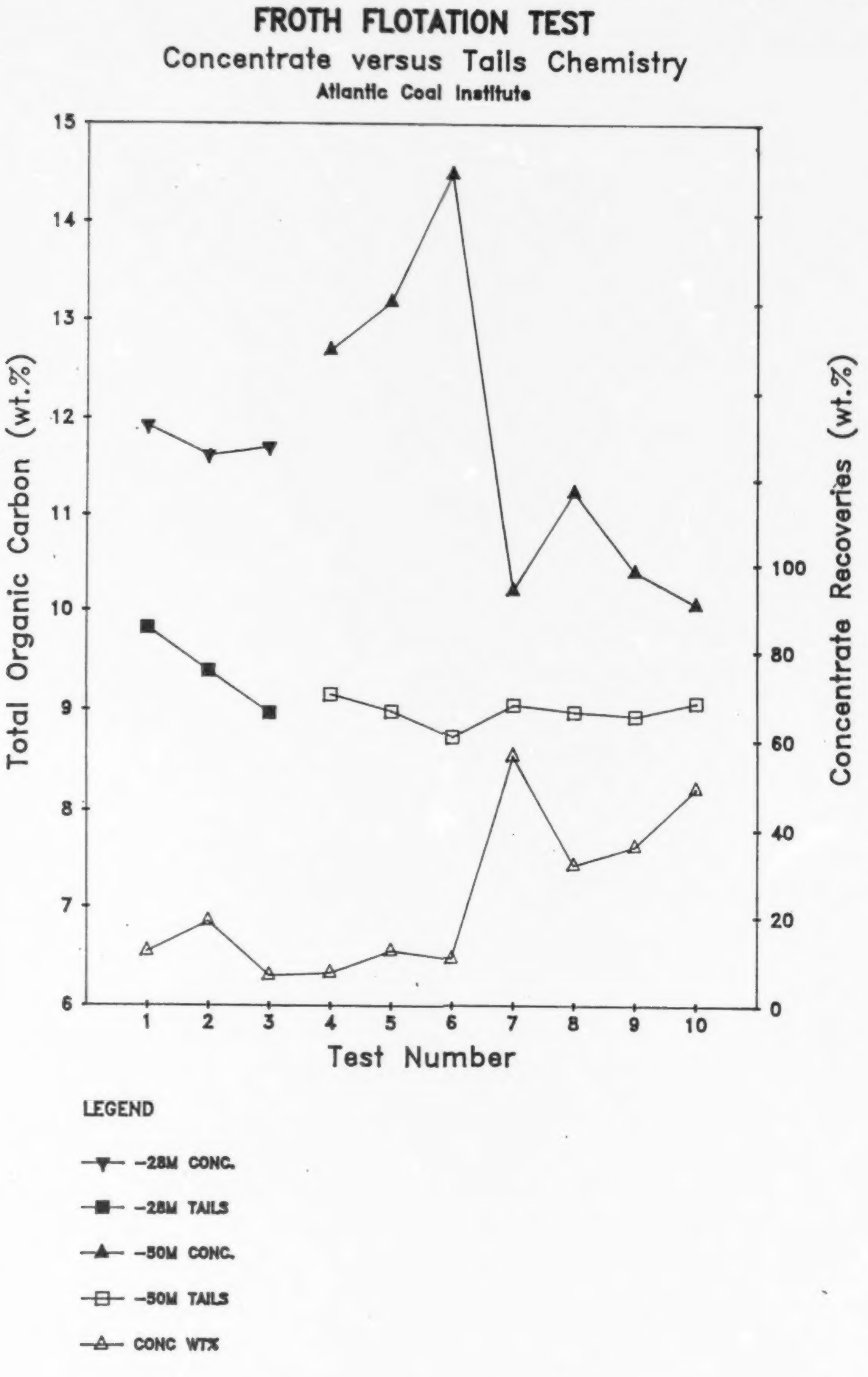
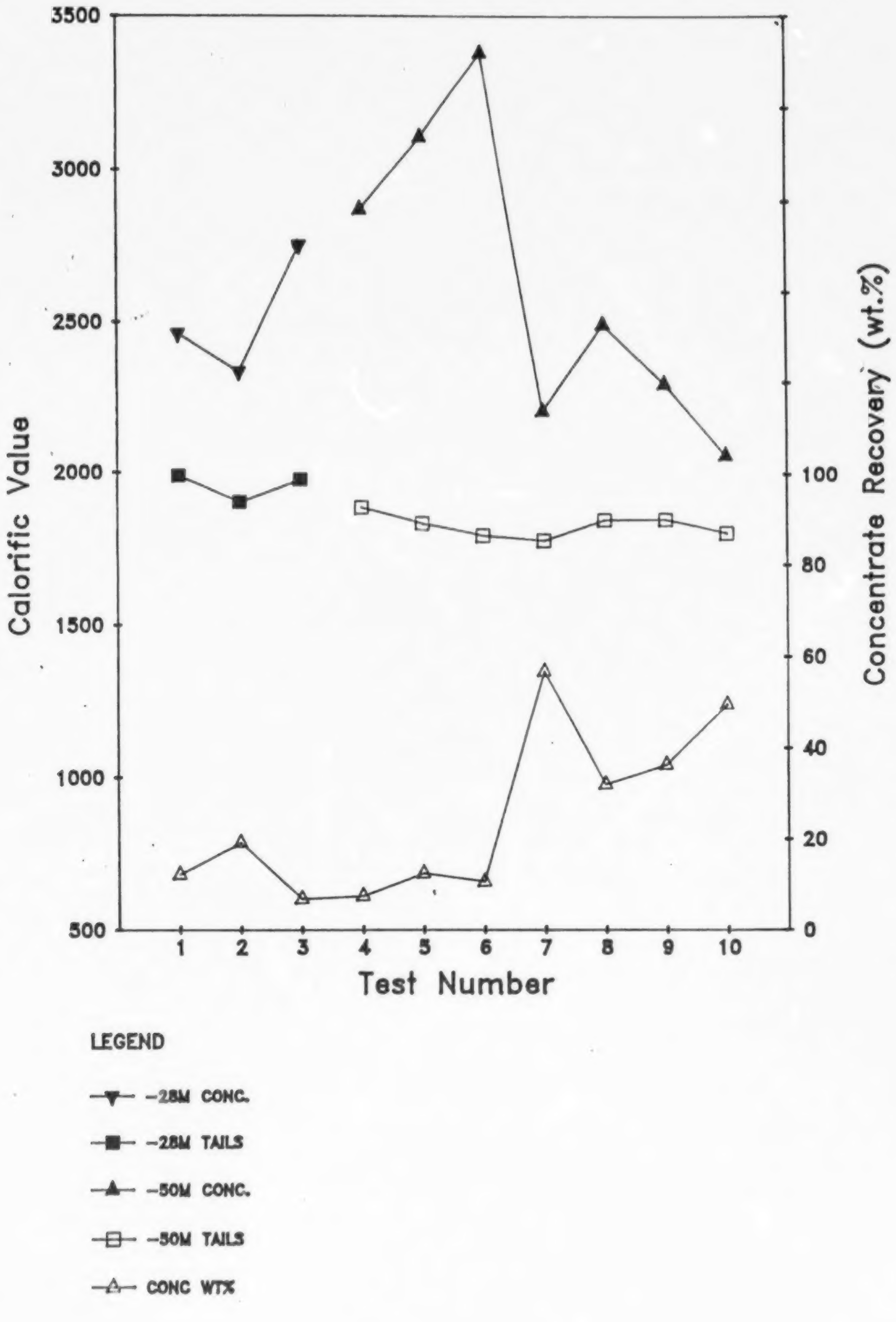

FROTH FLOTATION TEST
Concentrate versus Tails Chemistry
Atlantic Coal Institute
Total Organic Carbon (wt.%)
15
14
13
12
11
10
9
8
7
6
Concentrate Recoveries (wt.%)
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
Test Number
LEGEND
▼ -28M CONC.
■ -28M TAILS
▲ -50M CONC.
□ -50M TAILS
△ CONC WT%

Figure 2.



FROTH FLOTATION TEST

Concentrate versus Tails Chemistry

Atlantic Coal Institute

Figure 3

FROTH FLOTATION TEST

Concentrate versus Tails Chemistry

Atlantic Coal Institute

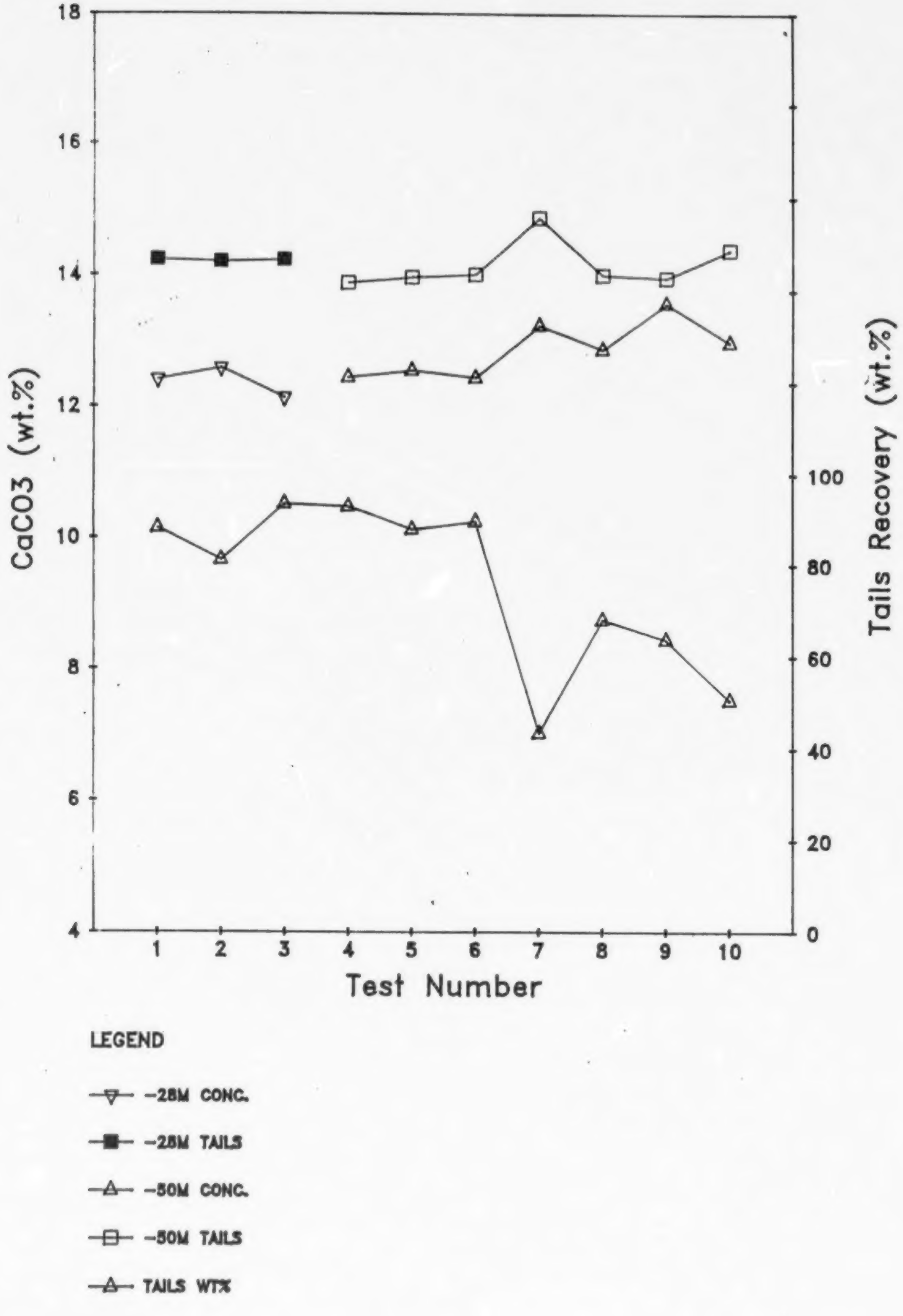
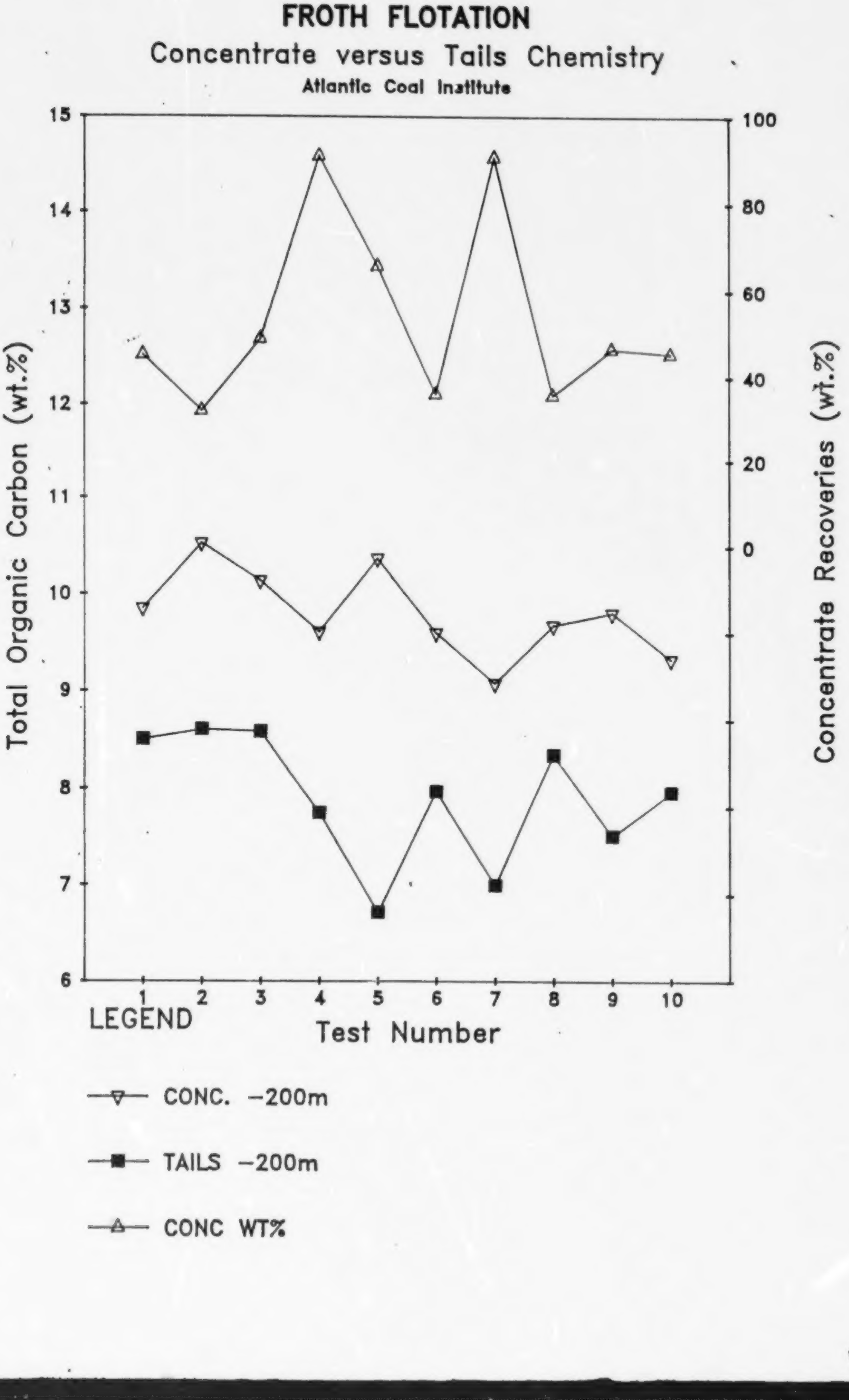


Figure 4.



FROTH FLOTATION

Concentrate versus Tails Chemistry

Atlantic Coal Institute

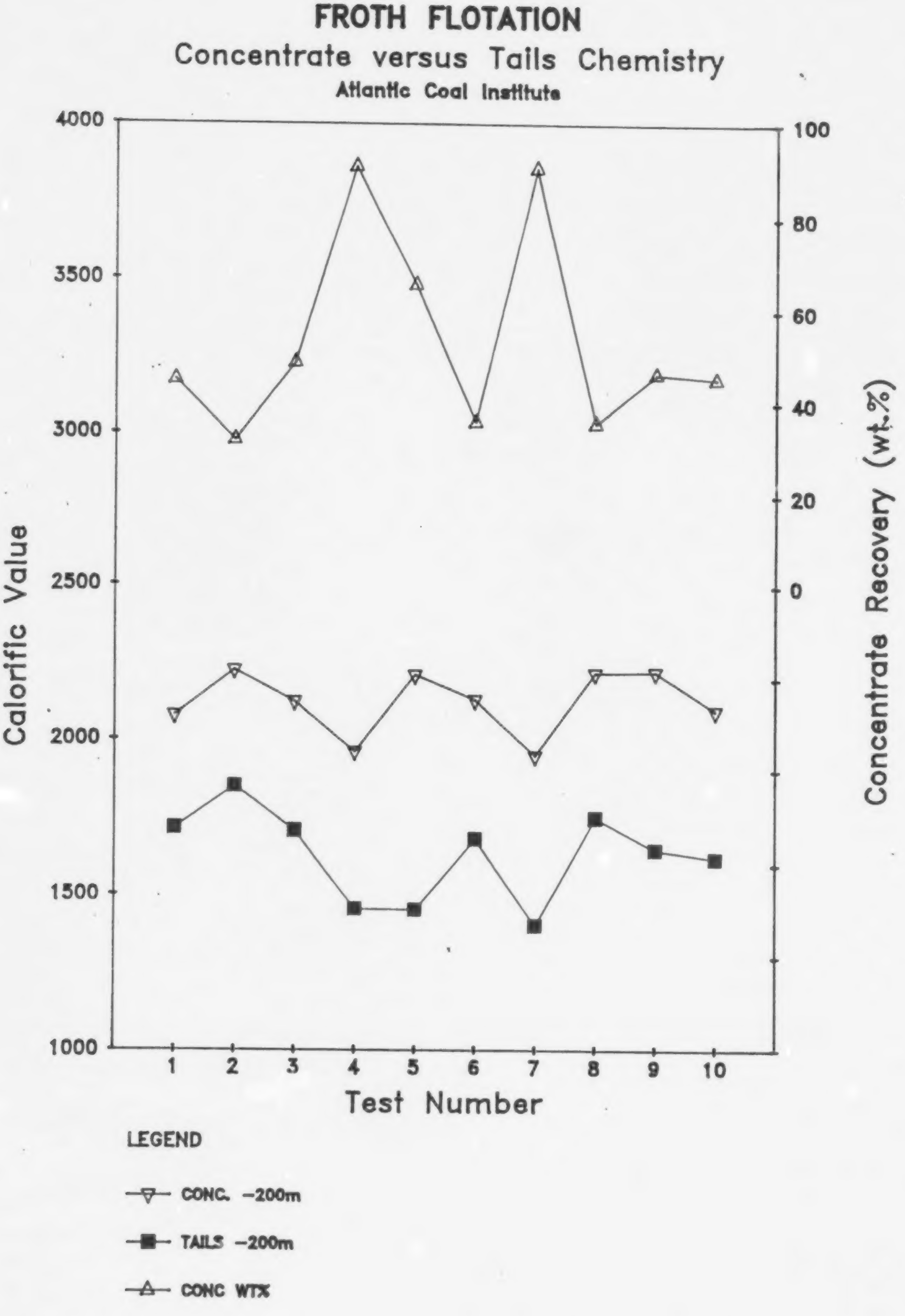
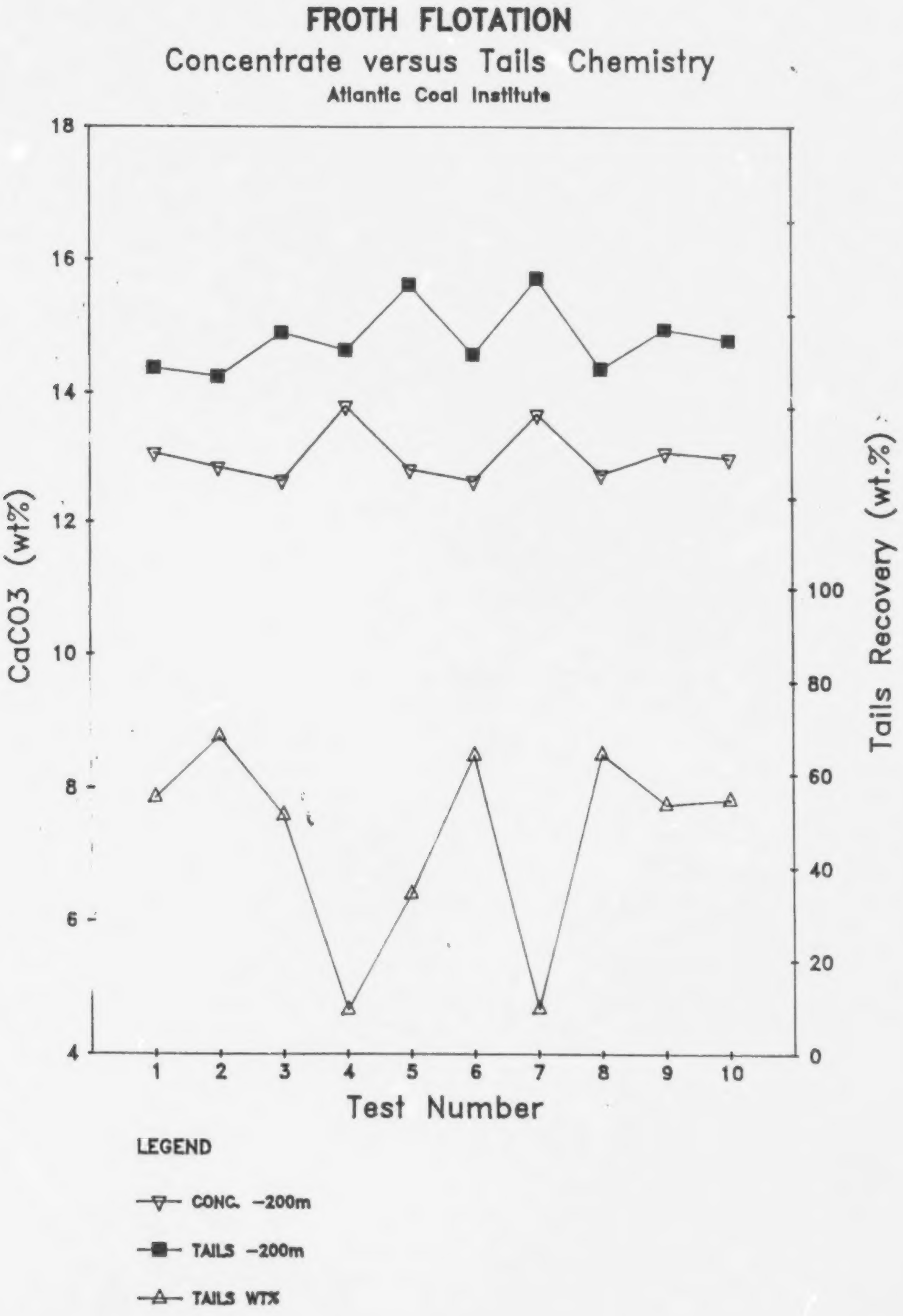

FROTH FLOTATION
Concentrate versus Tails Chemistry
Atlantic Coal Institute
4000
3500
3000
2500
2000
1500
1000
Calorific Value
100
80
60
40
20
0
Concentrate Recovery (wt.%)
1
2
3
4
5
6
7
8
9
10
Test Number
LEGEND
CONC. -200m
TAILS -200m
CONC WT%

Figure 6



FROTH FLOTATION
Concentrate versus Tails Chemistry
Atlantic Coal Institute

Figure 7. **FROTH REFLOTATION TEST**

Concentrate versus Tails Chemistry

Atlantic Coal Institute

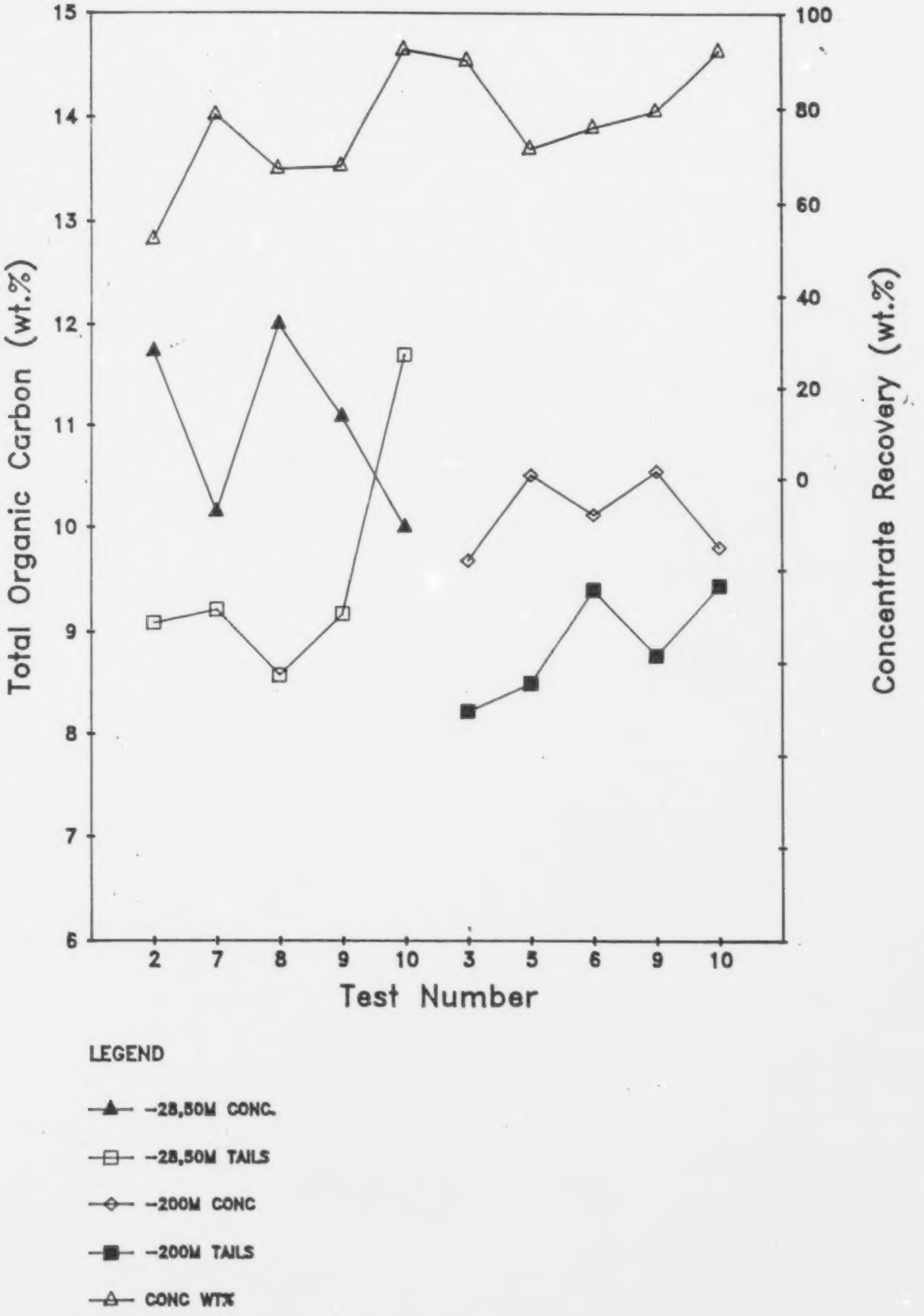


Figure 8.

FROTH REFLOTATION TEST

Concentrate versus Tails Chemistry

Atlantic Coal Institute

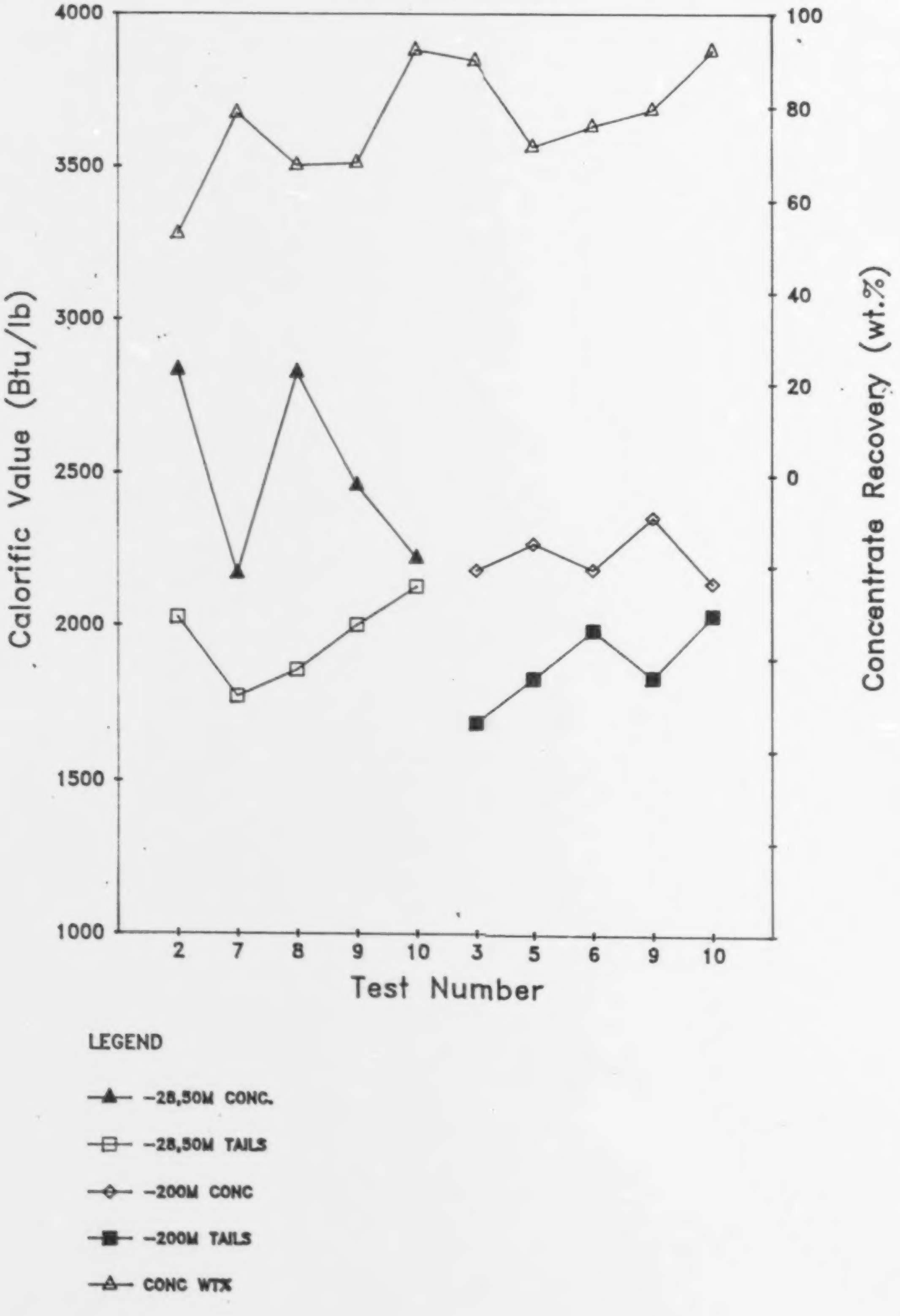
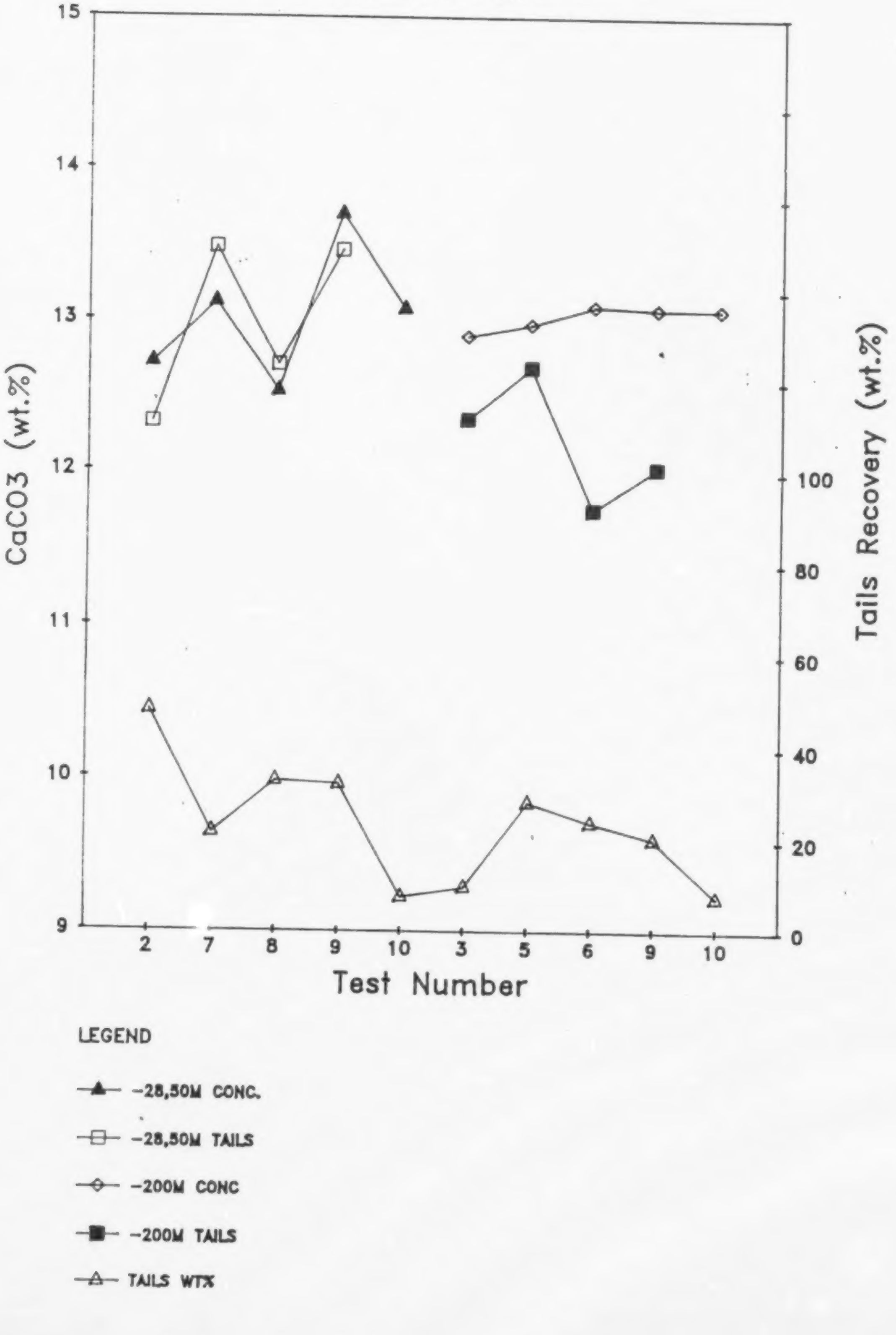


Figure 9



FROTH REFLOTATION TEST
Concentrate versus Tails Chemistry
Atlantic Coal Institute

APPENDIX I

ANALYTICAL DATA

G. Magnetic Separation

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TABLE 1 : MAGNETIC SEPARATION PARAMETERS

TEST NO.	PARTICLE SIZE (mesh)	TUBE ANGLE	AGITATIO TIME (sec)	CLEAN (wt.%)	REFUSE (wt.%)
TEST # 1	-200	42	42	99.02	0.04
TEST # 2	-200	42	52	99.04	0.06

TABLE 2 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS - MAGNETIC SEPARATION

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.	CALORIFIC VALUE@
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	(Btu/lb)
#1 CLEAN* #1 REFUSE	0.00	6.71	70.86	440	9.28	0.09	764	1763
#2 CLEAN* #2 REFUSE	0.00	7.25	71.35	441	9.80	0.09	728	1913

@ NOT CORRECTED FOR SULPHUR
* INSUFFICIENT SAMPLE

TABLE 3 : XRF WHOLE ROCK ANALYSIS - MAGNETIC SEPARATION - MAJOR OXIDES

AS DETERMINED SAMPLE I.D.		SiO_2 wt%	Al_2O_3 wt%	TiO_2 wt%	Fe_2O_3 wt%	MnO wt%	MgO wt%	CaO wt%	Na_2O wt%	K_2O wt%	P_2O_5 wt%	LOI wt%	TOTAL MAJORS
MAG #1	CLEAN *												
	REFUSE	45.2	12.5	0.61	4.96	0.10	2.55	7.67	1.32	2.15	0.52	21.5	99.1
MAG# 2	CLEAN *												
	REFUSE	45.5	12.4	0.62	4.93	0.10	2.56	7.62	1.32	2.13	0.52	21.5	99.2

* INSUFFICIENT SAMPLE

TABLE 4 : XRF WHOLE ROCK ANALYSIS - MAGNETIC SEPARATION - MAJOR ELEMENTS AND CARBONATES CALCULATED

CALCULATED SAMPLE I.D.		Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	$CaCO_3$ wt.%	$MgCO_3$ wt.%
MAG #1	CLEAN *												
	REFUSE	21.13	6.62	0.37	3.47	0.08	1.54	5.48	0.98	1.78	0.23	13.7	5.61
MAG# 2	CLEAN *												
	REFUSE	21.27	6.56	0.37	3.45	0.08	1.54	5.45	0.98	1.77	0.23	13.6	5.63

* INSUFFICIENT SAMPLE

TABLE 5 : XRF WHOLE ROCK ANALYSIS - MAGNETIC SEPARATION - ADDITIONAL ELEMENTS

SAMPLE I.D.		Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
MAG #1	CLEAN *							
	REFUSE	50	120	450	20	90	10	400
MAG# 2	CLEAN *							
	REFUSE	50	100	460	20	80	20	410

* INSUFFICIENT SAMPLE

APPENDIX I

ANALYTICAL DATA

H. Air Classification

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TABLE 1 : AIR CLASSIFICATION TEST #1 RECOVERIES

MESH SETTING	AVERAGE PARTICLE SIZE (MICRONS)	PERCENT RECOVERED	CUMULATIVE PERCENT
M = 0	3.0	0.31	0.31
M = 2	4.0	0.67	0.98
M = 4	6.0	1.78	2.76
M = 6	7.0	29.86	32.62
M = 8	18.0	62.57	95.19
COARSE	34.0	4.81	100.00

AIR CLASSIFICATION TEST #2 RECOVERIES

MESH SETTING	AVERAGE PARTICLE SIZE (MICRONS)	PERCENT RECOVERED	CUMULATIVE PERCENT
M = 0	3.0	0.22	0.22
M = 2	4.0	0.37	0.59
M = 4	5.0	1.42	2.01
M = 6	7.0	28.18	30.19
M = 8	18.0	64.26	94.45
COARSE	30.0	5.55	100.00

AIR CLASSIFICATION TEST #3 RECOVERIES

AIR CLASSIFICATION TEST #3

MESH SETTING	AVERAGE PARTICLE SIZE (MICRONS)	PERCENT RECOVERED	CUMULATIVE PERCENT
M = 0	2.0	0.22	0.22
M = 2	2.0	0.61	0.83
M = 4	3.0	0.96	1.79
M = 6	4.0	22.26	24.05
M = 8	6.0	70.57	94.62
COARSE	31.0	5.38	100.00

TABLE 2 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS - AIR CLASSIFICATION TESTS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	D.P.I.	H.I.	CALORIFIC VALUE@
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	
#1 V=10 M=0	0.00	6.23	64.24	437	8.44	0.09	761	1800
#1 V=10 M=2	0.00	7.74	71.48	438	9.56	0.10	748	2040
#1 V=10 M=4	0.00	8.05	76.97	438	9.98	0.09	771	2261
#1 V=10 M=6	0.00	7.23	70.65	440	7.35	0.09	961	1969
#1 V=10 M=8 FINE	0.00	7.02	68.58	443	8.26	0.09	830	1701
#1 V=10 M=8 COARSE	0.00	6.98	68.76	444	8.51	0.09	808	1801
#2 V=10 M=0	0.00	8.06	72.73	437	9.85	0.10	738	2137
#2 V=10 M=2	0.00	8.36	75.55	436	10.17	0.10	743	2229
#2 V=10 M=4	0.00	8.52	78.26	437	10.25	0.10	764	2278
#2 V=10 M=6	0.00	7.48	73.25	442	9.31	0.09	787	1998
#2 V=10 M=8 FINE	0.00	7.22	70.13	443	8.63	0.09	813	1764
#2 V=10 M=8 COARSE	0.00	6.86	69.13	443	8.62	0.09	802	1702
#3 V=10 M=0	0.00	7.96	73.31	436	9.87	0.10	743	2199
#3 V=10 M=2	0.00	7.94	74.79	436	10.26	0.10	729	2223
#3 V=10 M=4	0.00	7.86	77.00	439	10.02	0.09	768	2259
#3 V=10 M=6	0.00	7.57	73.56	442	9.28	0.09	793	2032
#3 V=10 M=8 FINE	0.00	7.20	69.66	442	8.67	0.09	803	1854
#3 V=10 M=8 COARSE	0.00	6.57	68.03	442	8.76	0.09	777	1651

@ NOT CORRECTED FOR SULPHUR

TABLE 3 : XRF WHOLE ROCK ANALYSIS - AIR CLASSIFICATION - MAJOR OXIDES

SAMPLE I.D.	SiO2 wt%	Al2O3 wt%	TiO2 wt%	Fe2O3 wt%	MnO wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	LOI wt%	TOTAL MAJORS
#1 V=10 M=0 *												
#1 V=10 M=2 *												
#1 V=10 M=4 *												
#1 V=10 M=6	45.0	12.5	0.62	5.24	0.10	2.60	7.31	1.33	2.16	0.51	21.8	99.2
#1 V=10 M=8 FINE	44.9	11.8	0.58	4.92	0.09	2.55	8.21	1.47	2.02	0.51	21.7	98.8
#1 V=10 M=8 COARSE	44.9	11.3	0.55	5.04	0.10	2.63	9.23	1.42	1.89	0.53	21.5	99.1
#2 V=10 M=0 *												
#2 V=10 M=2 *												
#2 V=10 M=4 *												
#2 V=10 M=6	44.5	12.6	0.62	5.21	0.10	2.59	7.07	1.29	2.21	0.51	22.4	99.1
#2 V=10 M=8 FINE	45.3	11.9	0.59	5.03	0.09	2.56	8.30	1.42	1.96	0.52	21.5	99.2
#2 V=10 M=8 COARSE	45.2	11.4	0.56	5.02	0.10	2.62	9.24	1.44	1.88	0.53	21.3	99.3
#3 V=10 M=0 *												
#3 V=10 M=2 *												
#3 V=10 M=4 *												
#3 V=10 M=6	45.2	12.7	0.63	5.21	0.10	2.56	7.05	1.24	2.25	0.51	21.9	99.4
#3 V=10 M=8 FINE	45.8	12.0	0.58	5.01	0.10	2.58	8.17	1.44	2.01	0.52	20.9	99.1
#3 V=10 M=8 COARSE	45.1	11.4	0.56	5.03	0.10	2.61	9.24	1.40	1.88	0.54	21.5	99.4

* INSUFFICIENT SAMPLE

TABLE 4 : XRF WHOLE ROCK ANALYSIS - AIR CLASSIFICATION - MAJOR ELEMENTS AND CARBONATES CALCULATED

Sample I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	CaCO3 wt.%	MgCO3 wt.%
#1 V=10 M=0 *												
#1 V=10 M=2 *												
#1 V=10 M=4 *												
#1 V=10 M=6	21.0	6.62	0.37	3.7	0.077	1.57	5.2	0.99	1.8	0.22	13.05	5.44
#1 V=10 M=8 FINE	21.0	6.25	0.35	3.4	0.070	1.54	5.9	1.09	1.7	0.22	14.65	5.34
#1 V=10 M=8 COARSE	21.0	5.98	0.33	3.5	0.077	1.59	6.6	1.05	1.6	0.23	16.47	5.50
#2 V=10 M=0 *												
#2 V=10 M=2 *												
#2 V=10 M=4 *												
#2 V=10 M=6	20.8	6.67	0.37	3.6	0.077	1.56	5.1	0.96	1.8	0.22	12.62	5.42
#2 V=10 M=8 FINE	21.2	6.30	0.35	3.5	0.070	1.54	5.9	1.05	1.6	0.23	14.81	5.36
#2 V=10 M=8 COARSE	21.1	6.03	0.34	3.5	0.077	1.58	6.6	1.07	1.6	0.23	16.49	5.48
#3 V=10 M=0 *												
#3 V=10 M=2 *												
#3 V=10 M=4 *												
#3 V=10 M=6	21.1	6.72	0.38	3.6	0.077	1.54	5.0	0.92	1.9	0.22	12.58	5.36
#3 V=10 M=8 FINE	21.4	6.35	0.35	3.5	0.077	1.56	5.8	1.07	1.7	0.23	14.58	5.40
#3 V=10 M=8 COARSE	21.1	6.03	0.34	3.5	0.077	1.57	6.6	1.04	1.6	0.24	16.49	5.46

* INSUFFICIENT SAMPLE

TABLE 5 : XRF WHOLE ROCK ANALYSIS - AIR CLASSIFICATION - ADDITIONAL ELEMENTS

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
#1 V=10 M=0 *							
#1 V=10 M=2 *							
#1 V=10 M=4 *							
#1 V=10 M=6	50	100	440	10	80	10	420
#1 V=10 M=8 FINE	40	100	450	20	80	20	430
#1 V=10 M=8 COARSE	30	100	500	<10	90	10	410
#2 V=10 M=0 *							
#2 V=10 M=2 *							
#2 V=10 M=4 *							
#2 V=10 M=6	40	100	430	10	90	30	390
#2 V=10 M=8 FINE	40	100	470	10	90	10	420
#2 V=10 M=8 COARSE	30	90	490	10	90	10	410
#3 V=10 M=0 *							
#3 V=10 M=2 *							
#3 V=10 M=4 *							
#3 V=10 M=6	40	120	430	30	100	10	430
#3 V=10 M=8 FINE	40	100	470	20	110	20	360
#3 V=10 M=8 COARSE	30	80	490	20	90	30	420

* INSUFFICIENT SAMPLE

TABLE 6 : ORGANIC AND CARBONATE RECOVERIES - AIR CLASSIFICATION

TEST NO.	(wt.%)	T.O.C. RECOVERY (wt.%)	CALORIFIC VALUE RECOVERY	CaCO3 RECOVERY	MgCO3 RECOVERY
#1 V=10 M=0	0.31	0.29	0.29		
#1 V=10 M=2	0.67	0.71	0.71		
#1 V=10 M=4	1.78	1.97	2.09		
#1 V=10 M=6	29.86	24.36	30.48	28.23	27.30
#1 V=10 M=8 FINE	62.57	57.36	55.17	66.44	56.11
#1 V=10 M=8 COARSE	4.81	4.54	4.49	5.74	4.45
#2 V=10 M=0	0.22	0.24	0.24		
#2 V=10 M=2	0.37	0.42	0.43		
#2 V=10 M=4	1.42	1.62	1.68		
#2 V=10 M=6	28.18	29.12	29.19	25.77	25.67
#2 V=10 M=8 FINE	64.26	61.55	58.76	68.98	57.85
#2 V=10 M=8 COARSE	5.55	5.31	4.90	6.63	5.11
#3 V=10 M=0	0.22	0.24	0.25		
#3 V=10 M=2	0.61	0.69	0.70		
#3 V=10 M=4	0.96	1.07	1.12		
#3 V=10 M=6	22.26	22.93	23.45	20.30	20.04
#3 V=10 M=8 FINE	70.57	67.91	67.83	74.57	64.02
#3 V=10 M=8 COARSE	5.38	5.23	4.60	6.43	4.94

Figure 1

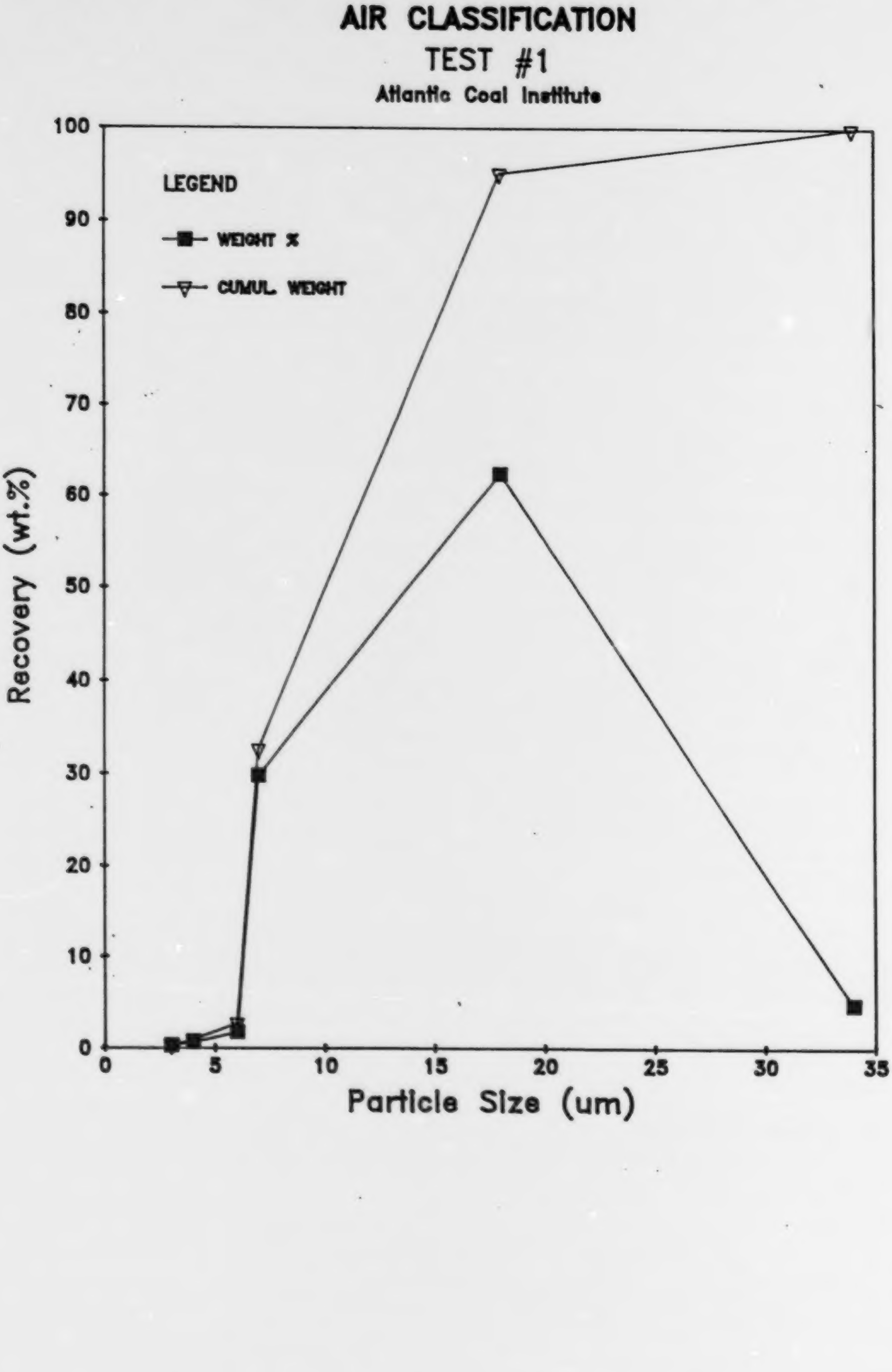
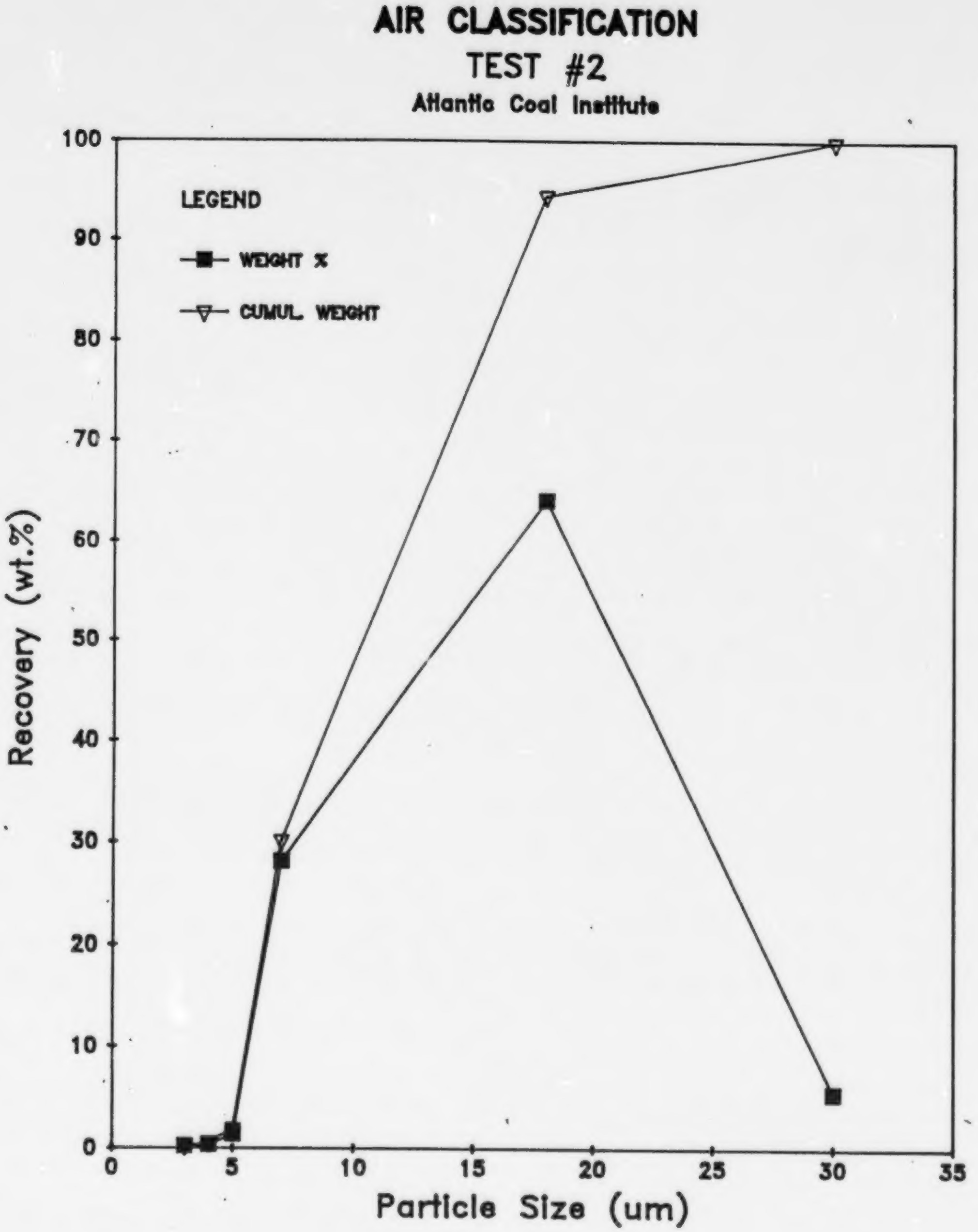
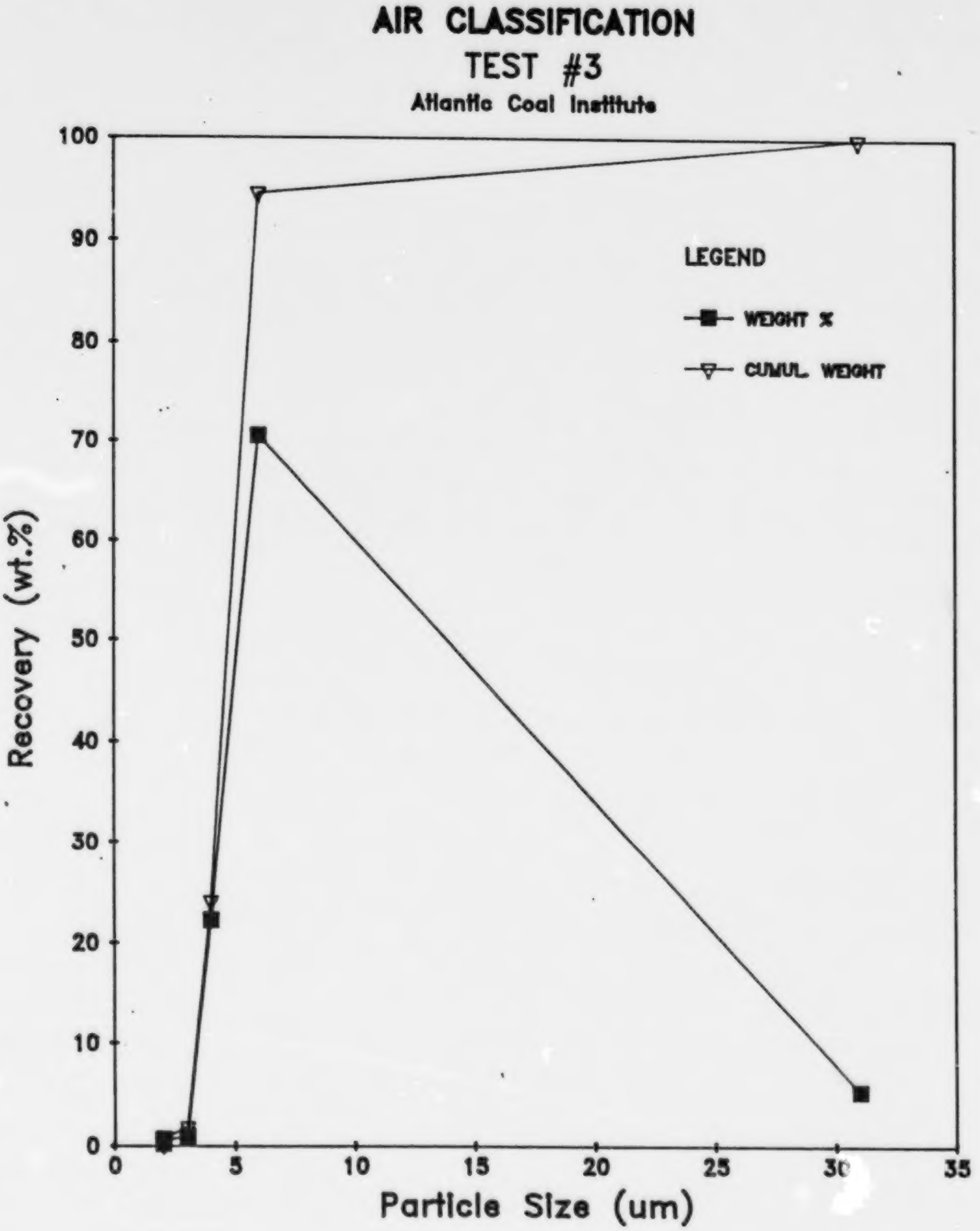

AIR CLASSIFICATION
TEST #1
Atlantic Coal Institute
LEGEND
WEIGHT %
CUMUL. WEIGHT
Recovery (wt.%)
0
10
20
30
40
50
60
70
80
90
100
Particle Size (um)
0
5
10
15
20
25
30
35

Figure 2.


AIR CLASSIFICATION
TEST #2
Atlantic Coal Institute
LEGEND
WEIGHT %
CUMUL. WEIGHT
Recovery (wt.%)
0
10
20
30
40
50
60
70
80
90
100
Particle Size (um)
0
5
10
15
20
25
30
35


AIR CLASSIFICATION
TEST #3
Atlantic Coal Institute
Recovery (wt.%)
100
90
80
70
60
50
40
30
20
10
0
Particle Size (um)
0
5
10
15
20
25
30
35
LEGEND
WEIGHT %
CUMUL. WEIGHT

APPENDIX I

ANALYTICAL DATA

I. Oil Agglomeration

APPENDIX I I
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TABLE 1. OIL AGGLOMERATION TESTS - PARAMETERS AND RECOVERIES

TEST #	PARTICLE SIZE	PERCENT SOLIDS IN SLURRY BY wt.	CONDITIONING AGENTS	COLLECTOR TYPE	COLLECTOR* DOSAGE	PERCENT AGGLOMERATE	PERCENT TAILS
1	-200 mesh	15	NONE	#2 FUEL OIL	4.00	0.00	100.00
2	-200 mesh	10	HCL,DISPERSANT	VARSOL	8.00	0.00	100.00
3	-200 mesh	10	DISPERSANT	VARSOL	8.00	0.34	99.66
4	-200 mesh	10	H2SO4,DISPERSANT	VARSOL	15.00	1.43	98.57
5	-200 mesh	10	H2SO4,DISPERSANT	KEROSENE	16.00	0.60	99.40
6	-200 mesh	5	H2SO4,DISPERSANT	KEROSENE	16.00	0.00	100.00
7	-200 mesh	5	H2SO4,DISPERSANT	VARSOL	16.00	0.54	99.46
8	-200 mesh	5	H2SO4,DISPERSANT	VARSOL	15.00	1.09	98.91

AGGLOMERATION OF FLOTATION CONCENTRATES

1A	-200 mesh (FLOTATION CONC.#8)	5	H2SO4,DISPERSANT	VARSOL	16.00	1.94	98.06
2A	-200 mesh (FLOTATION CONC.#7)	5	H2SO4,DISPERSANT	#2 FUEL OIL	16.50	0.51	99.49
3A	-200 mesh (FLOTATION CONC.#4)	5	H2SO4,DISPERSANT	KEROSENE	16.00	0.07	99.93

* COLLECTOR DOSAGE EXPRESSED AS WT. PERCENT OF ORIGINAL SAMPLE

TABLE 2 : ROCK-EVAL AND CALORIFIC VALUE ANALYSIS - OIL AGGLOMERATION TESTS

SAMPLE ID	S0 (mg/g)	S1 (mg/g)	S2 (mg/g)	T MAX	T.O.C. (WT%)	O.P.I.	H.I.	CALORIFIC VALUE@
	PRESENT HYDROCARBONS		POTENTIAL HYDROCARBONS	C	(0.82(S1+S2)+S4)/10	S1/(S0+S1+S2)	100*S2/TOC	
-200 mesh								
#1 CONC.*								
#1 TAILS	0.06	18.36	70.06	440	9.81	0.21	714	2125
#2 CONC.*								
#2 TAILS	0.00	7.93	69.33	438	8.69	0.10	798	2380
#3 CONC.	0.00	10.40	98.85	438	13.88	0.10	712	
#3 TAILS	0.00	6.77	69.06	439	9.00	0.09	767	1914
#4 CONC.	0.00	8.32	84.38	437	12.41	0.09	680	
#4 TAILS	0.00	7.20	66.68	439	8.43	0.10	791	1698
#5 CONC.	0.00	8.60	71.12	437	11.19	0.11	636	
#5 TAILS	0.00	5.32	37.37	436	7.58	0.12	493	
#6 CONC.*								
#6 TAILS	0.00	9.04	71.70	440	9.18	0.11	781	2020
#7 CONC.	0.00	8.69	90.20	440	12.53	0.09	720	
#7 TAILS	0.00	7.38	73.31	439	7.63	0.09	961	2018
#8 CONC.*								
#8 TAILS	0.00	7.34	72.51	440	9.09	0.09	798	2008
AGGLOMERATION OF FLOTATION CONCENTRATES -200 mesh								
#1A CONC.	0.06	11.76	85.85	439	12.28	0.12	699	
#1A TAILS	0.00	10.13	79.59	440	10.35	0.11	769	2317
#2A CONC.	0.00	10.32	51.08	437	8.06	0.17	634	
#2A TAILS	0.06	25.57	85.38	438	12.17	0.23	702	3107
#3A CONC.*								
#3A TAILS	0.00	9.79	76.39	442	9.58	0.11	797	2196

@ NOT CORRECTED FOR SULPHUR

* INSUFFICIENT SAMPLE

TABLE 3 : XRF WHOLE ROCK ANALYSIS - OIL AGGLOMERATION - MAJOR OXIDES

AS DETERMINED Sample I.D.	SiO2 wt%	Al2O3 wt%	TiO2 wt%	Fe2O3 wt%	MnO wt%	MgO wt%	CaO wt%	Na2O wt%	K2O wt%	P2O5 wt%	LOI wt%	TOTAL MAJORS
AGGLOMERATION												
-200 mesh												
AGG #1 clean *												
refuse	44.9	12.2	0.60	5.05	0.10	2.57	7.68	1.32	2.09	0.52	22.3	99.3
AGG #2 clean *												
refuse	44.9	12.3	0.62	5.02	0.08	2.44	6.41	1.33	2.12	0.53	24.1	99.9
AGG #3 clean *												
refuse	44.7	12.4	0.61	4.23	0.05	1.66	6.50	1.29	2.13	0.34	25.3	99.2
AGG #4 clean *												
refuse	44.9	12.0	0.60	4.02	0.04	1.38	6.60	1.28	2.08	0.36	27.5	100.8
AGG #5 clean *												
refuse	43.7	10.1	0.52	3.99	0.08	1.97	6.34	1.02	1.79	0.40	37.4	107.3
AGG #6 clean*												
refuse	45.8	12.6	0.64	3.27	0.02	1.06	5.82	1.38	2.17	0.10	27.3	100.2
AGG #7 clean*												
refuse	45.9	12.6	0.64	3.30	0.02	1.07	5.78	1.32	2.19	0.09	26.7	99.6
AGG #8 clean*												
refuse	46.0	12.5	0.64	3.09	0.02	1.02	6.30	1.33	2.17	0.09	26.8	100.0
AGGLOMERATION OF FLOTATION CONCENTRATES												
-200 mesh												
#1A clean *												
refuse	45.6	12.7	0.67	3.51	0.02	1.08	5.01	1.32	2.21	0.10	27.8	100.0
#2A clean *												
refuse	51.6	14.2	0.74	4.31	0.04	1.33	0.67	1.65	2.41	0.19	22.9	100.0
#3A clean *												
refuse	46.1	12.6	0.64	3.33	0.02	1.09	5.35	1.38	2.16	0.10	26.8	99.6

* Insufficient Sample

TABLE 4 : XRF WHOLE ROCK ANALYSIS - OIL AGGLOMERATION - MAJOR ELEMENTS AND CARBONATES CALCULATED

CALCULATED SAMPLE I.D.	Si wt.%	Al wt.%	Ti wt.%	Fe wt.%	Mn wt.%	Mg wt.%	Ca wt.%	Na wt.%	K wt.%	P wt.%	CaCO3 wt.%	MgCO3 wt.%
AGGLOMERATION -200 mesh												
#1 CONC. *												
#1 TAILS	20.99	6.46	0.36	3.53	0.08	1.55	5.49	0.98	1.73	0.23	13.71	5.65
#2 CONC. *												
#2 TAILS	20.99	6.51	0.37	3.51	0.06	1.47	4.58	0.99	1.76	0.23	11.44	5.37
#3 CONC. *												
#3 TAILS	20.90	6.56	0.37	2.96	0.04	1.00	4.65	0.96	1.77	0.15	11.60	3.65
#4 CONC. *												
#4 TAILS	20.99	6.35	0.36	2.81	0.03	0.83	4.72	0.95	1.73	0.16	11.78	3.04
#5 CONC. *												
#5 TAILS	20.43	5.35	0.31	2.79	0.06	1.19	4.53	0.76	1.49	0.17	11.32	4.33
#6 CONC. *												
#6 TAILS	21.41	6.67	0.38	2.29	0.02	0.64	4.16	1.02	1.80	0.04	10.39	2.33
#7 CONC. *												
#7 TAILS	21.46	6.67	0.38	2.31	0.02	0.65	4.13	0.98	1.82	0.04	10.32	2.35
#8 CONC. *												
#8 TAILS	21.51	6.62	0.38	2.16	0.02	0.62	4.50	0.99	1.80	0.04	11.24	2.24
AGGLOMERATION OF FLOTATION CONCENTRATES -200 mesh												
#1 CONC. *												
#1 TAILS	21.32	6.72	0.40	2.45	0.02	0.65	3.58	0.98	1.83	0.04	8.94	2.38
#2 CONC. *												
#2 TAILS	24.12	7.52	0.44	3.01	0.03	0.80	0.48	1.22	2.00	0.08	1.20	2.93
#3 CONC. *												
#3 TAILS	21.55	6.67	0.38	2.33	0.02	0.66	3.82	1.02	1.79	0.04	9.55	2.40

* INSUFFICIENT SAMPLE

TABLE 5 : XRF WHOLE ROCK ANALYSIS - OIL AGGLOMERATION - ADDITIONAL ELEMENTS

SAMPLE I.D.	Cr ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm
AGGLOMERATION							
#1 CONC. *							
#1 TAILS	50	110	450	30	90	10	390
#2 CONC. *							
#2 TAILS	50	110	380	20	100	10	420
#3 CONC. *							
#3 TAILS	50	110	360	20	100	20	430
#4 CONC. *							
#4 TAILS	70	100	340	30	90	10	400
#5 CONC. *							
#5 TAILS	60	80	380	30	70	20	350
#6 CONC. *							
#6 TAILS	90	100	250	20	90	30	430
#7 CONC. *							
#7 TAILS	90	110	230	10	90	20	430
#8 CONC. *							
#8 TAILS	70	110	280	10	90	10	440
AGGLOMERATION OF FLOTATION CONCENTRATES							
#1 CONC. *							
#1 TAILS	60	120	240	10	100	20	450
#2 CONC. *							
#2 TAILS	100	130	130	10	120	30	470
#3 CONC. *							
#3 TAILS	70	110	230	<10	90	20	430

* INSUFFICIENT SAMPLE

APPENDIX I

ANALYTICAL DATA

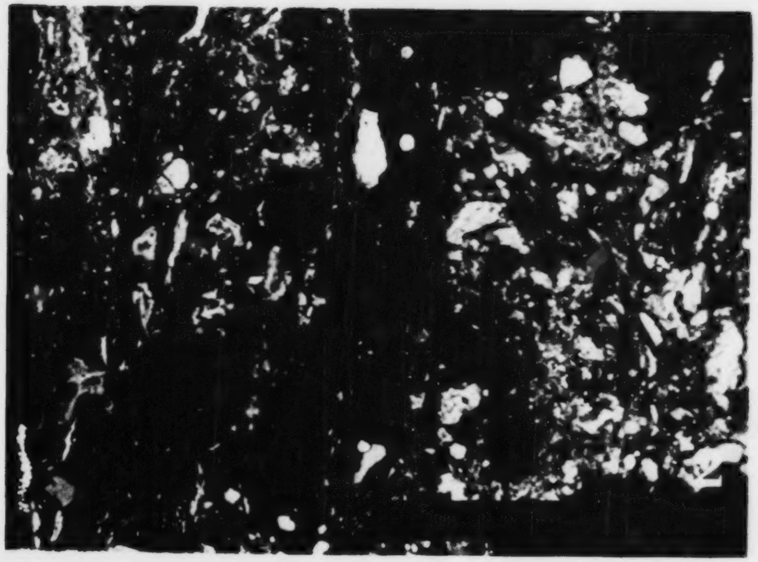
J. Scanning Electron Microscopy - Manual Survey

PLATE 1

New Brunswick Oil Shale - Control #3

Photo No.	Index No.	Description	Spectra No.
-20 mesh			
1	06-12-02	Grain exhibiting well preserved spore structures (black stringers) in a predominantly mineral rich matrix including abundant rounded albite grains, some finely disseminated pyrite crystals (bright), whispy clays and carbonates; B.E.I.; 500x.	1,2,3,4, 5,6
2	06-15-01	Grain with some degree of mineral lineation with bedding plane; note the organic bodies (black). Minerals include calcite, quartz, muscovite ?, illite, siderite ? and albite; B.E.I.; 350x.	7,8,9,10 11,12,13
3	06-15-02	Organic rich matrix (dark) in which minerals such as calcite, quartz, pyrite and clays were detected. Note the lineation of these minerals with the bedding plane; B.E.I.; 350x.	14,15,16, 17,18
4	06-15-03	Mineral rich grain with distinct organic body - probably alginite. Minerals include calcite, albite, pyrite and quartz; B.E.I.; 500x.	19,20,21, 22,23

1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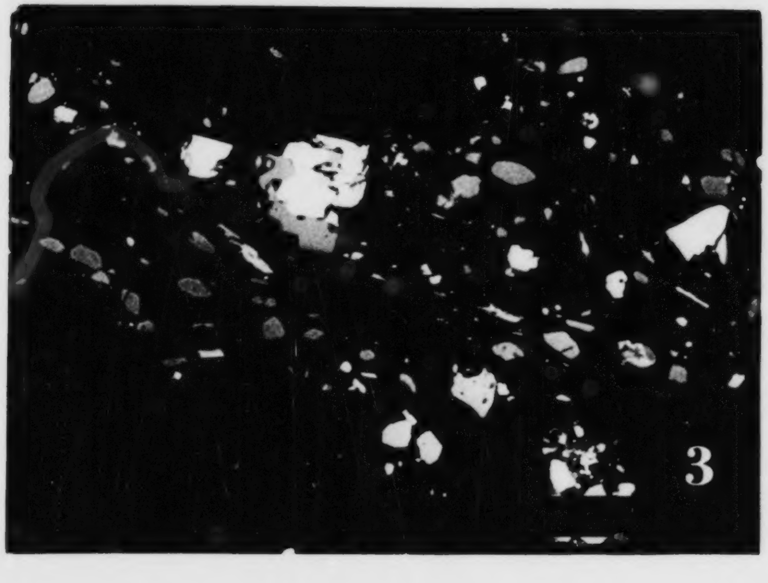
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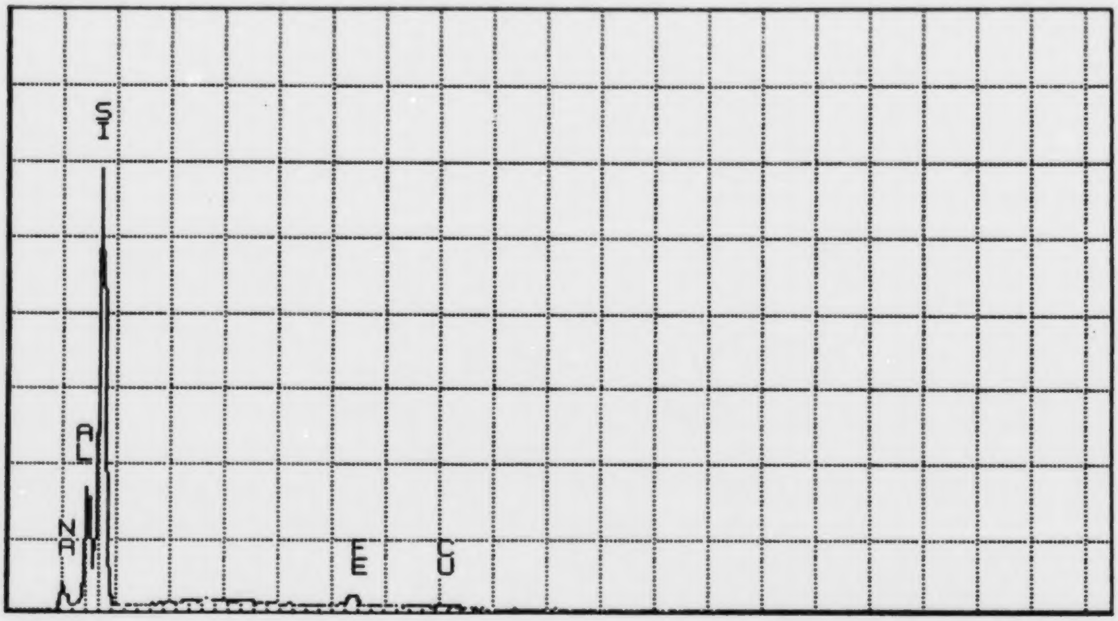

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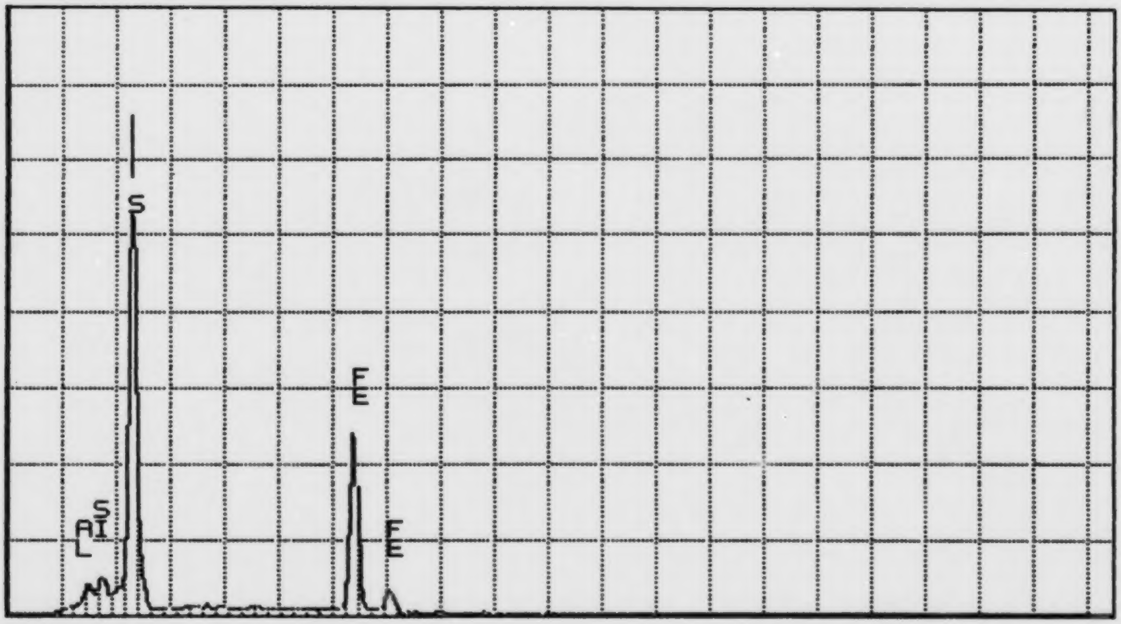

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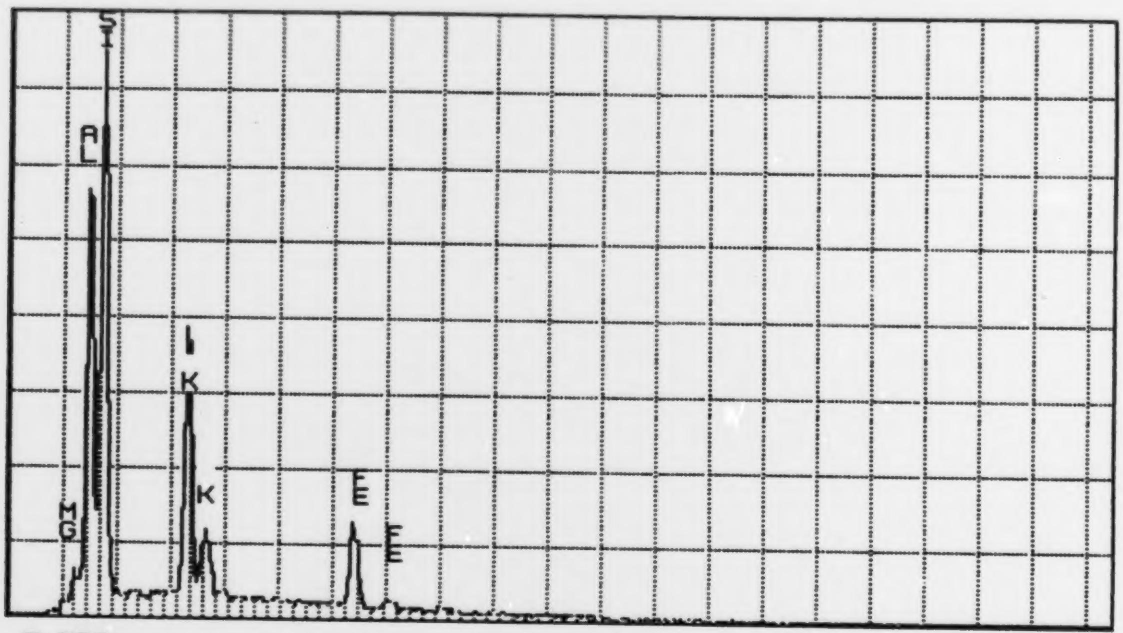

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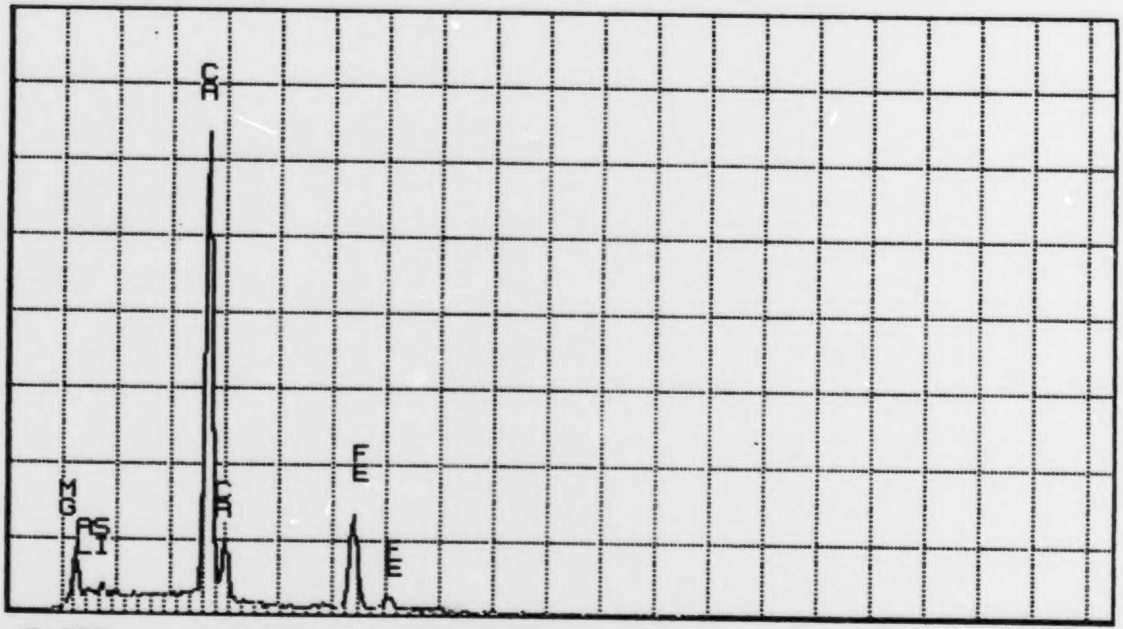

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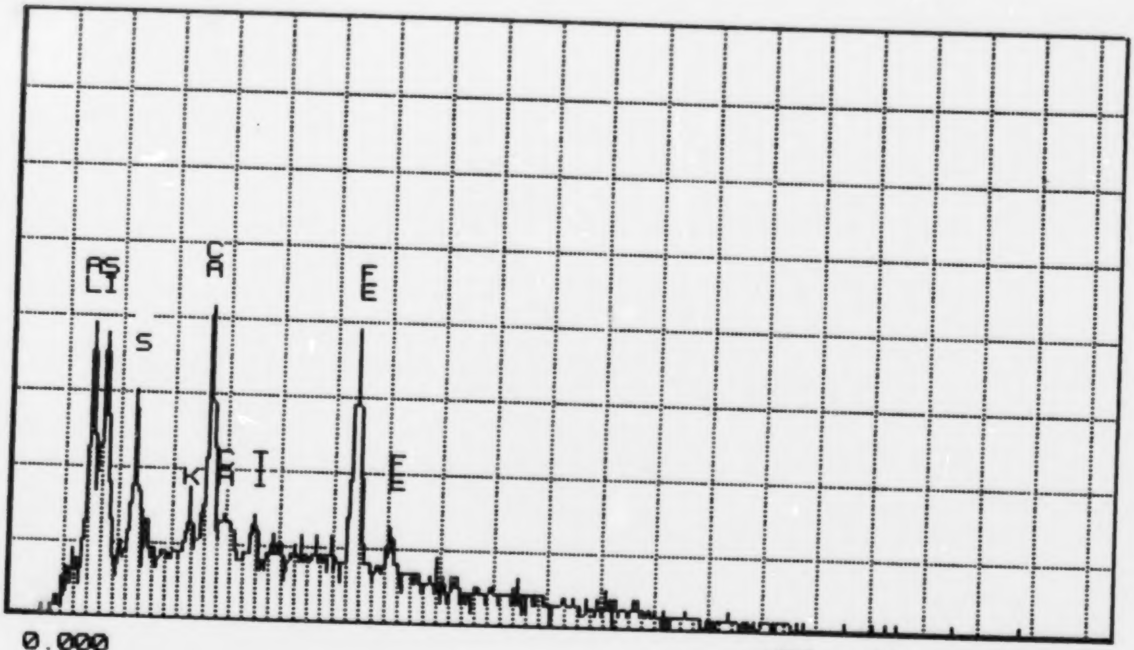

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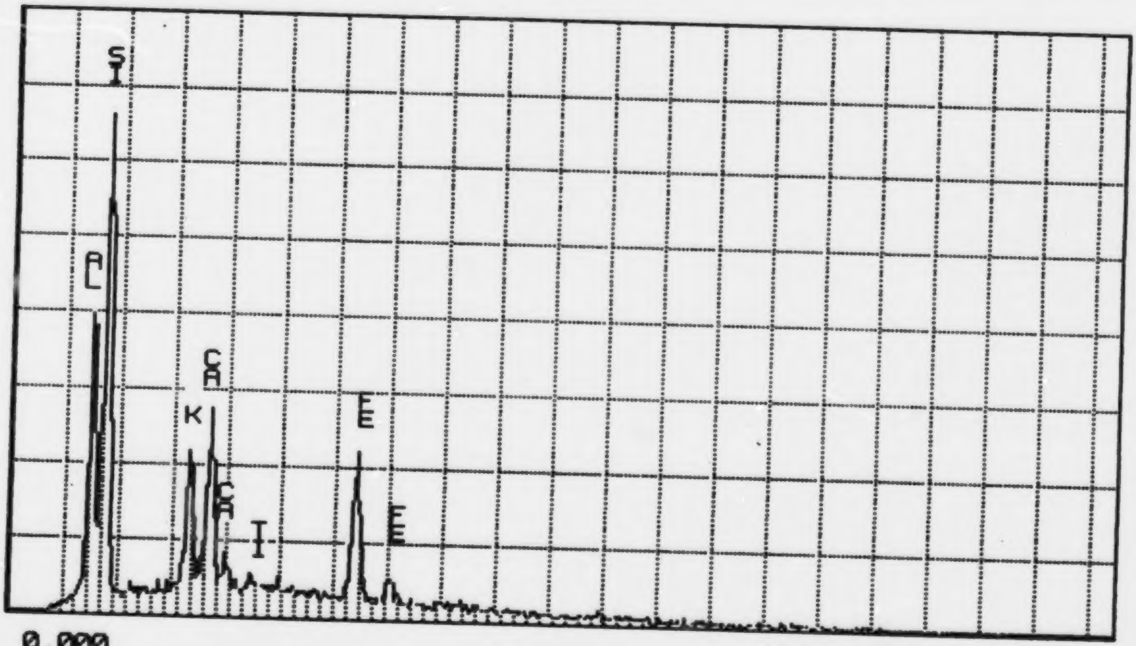

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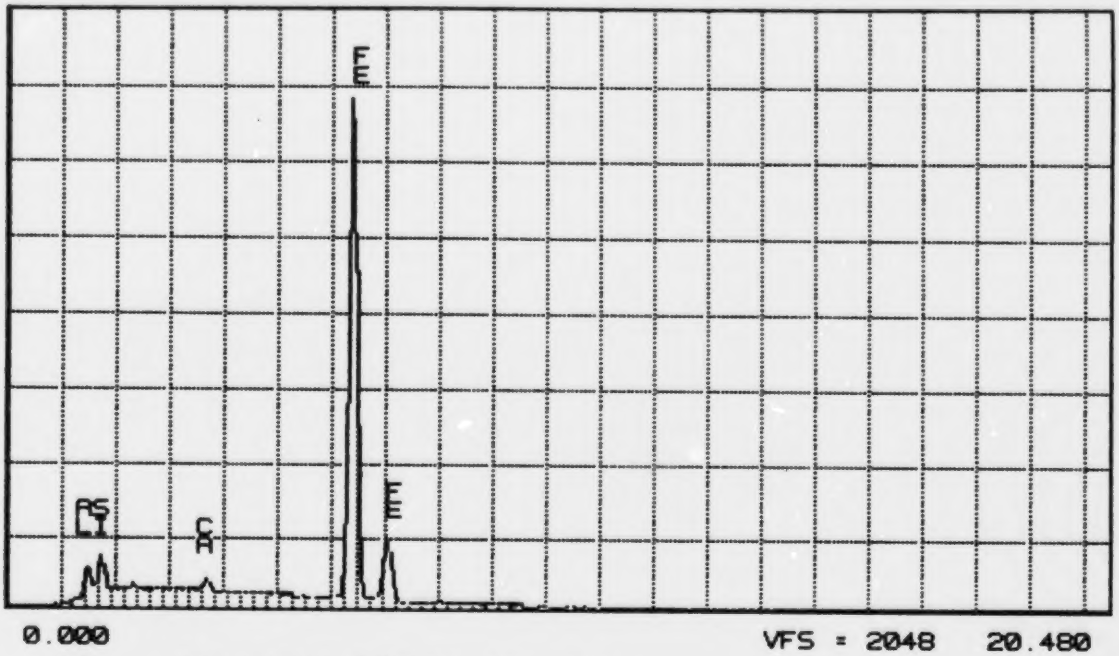

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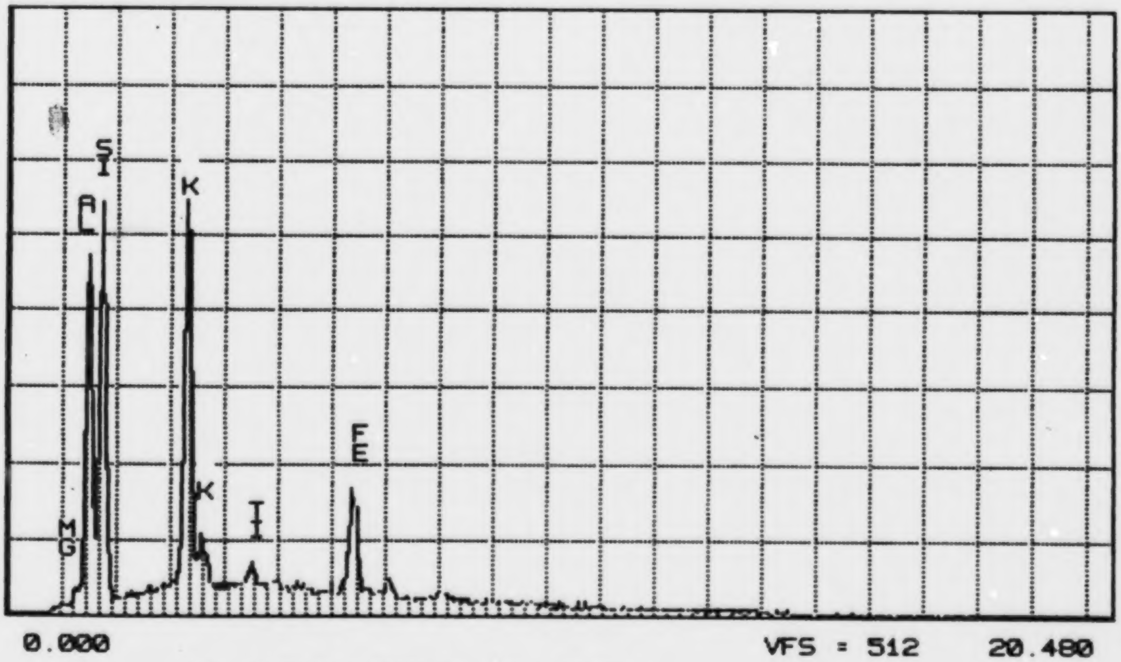

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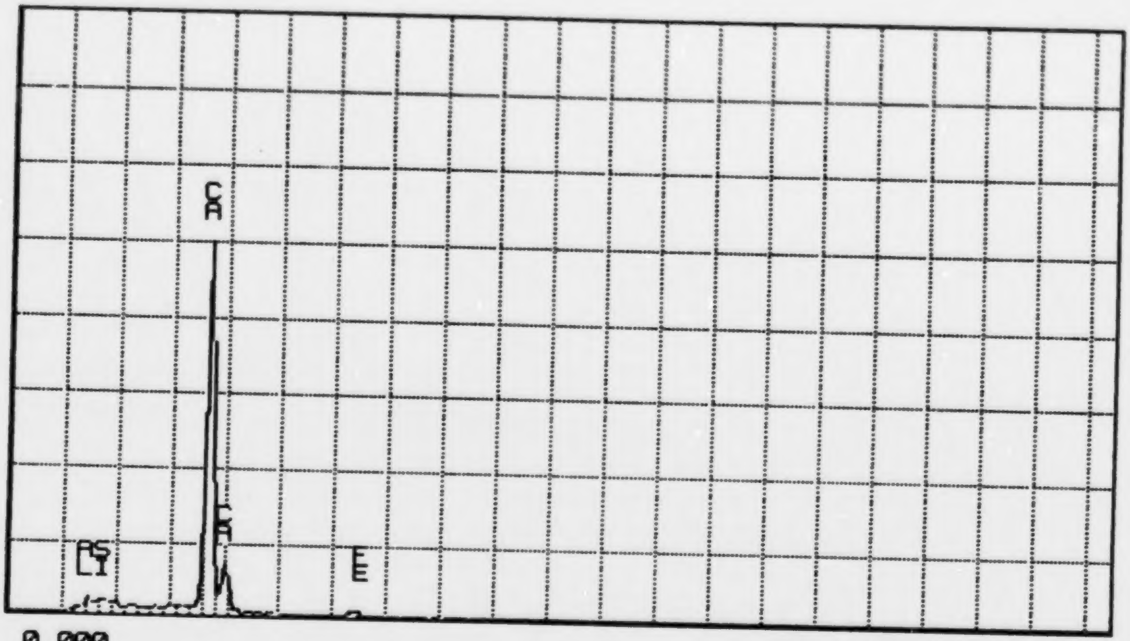

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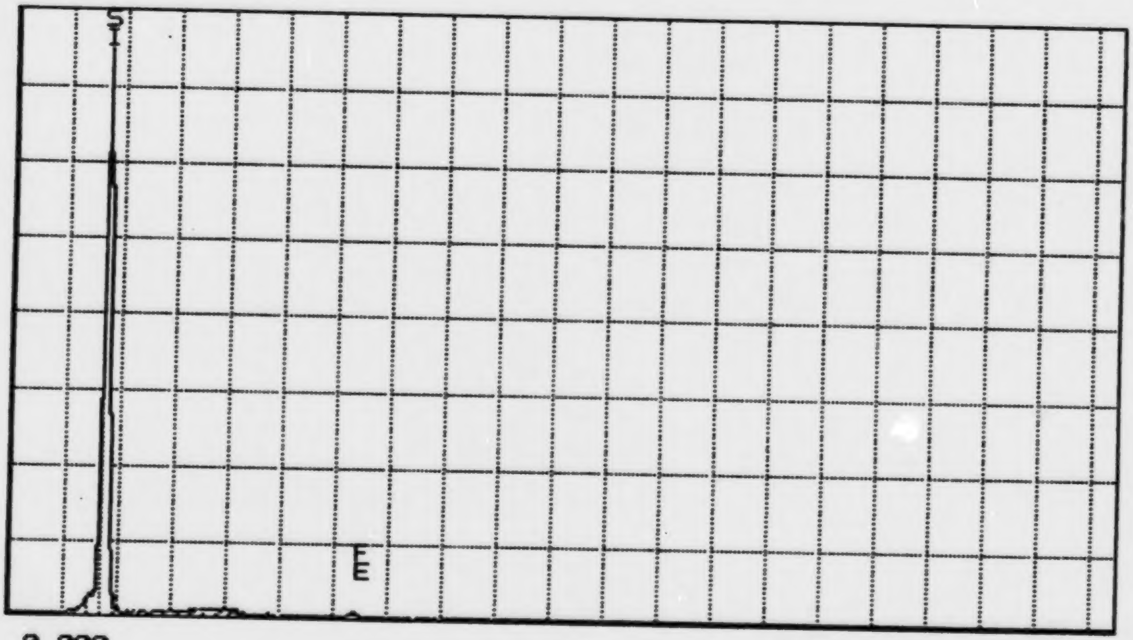

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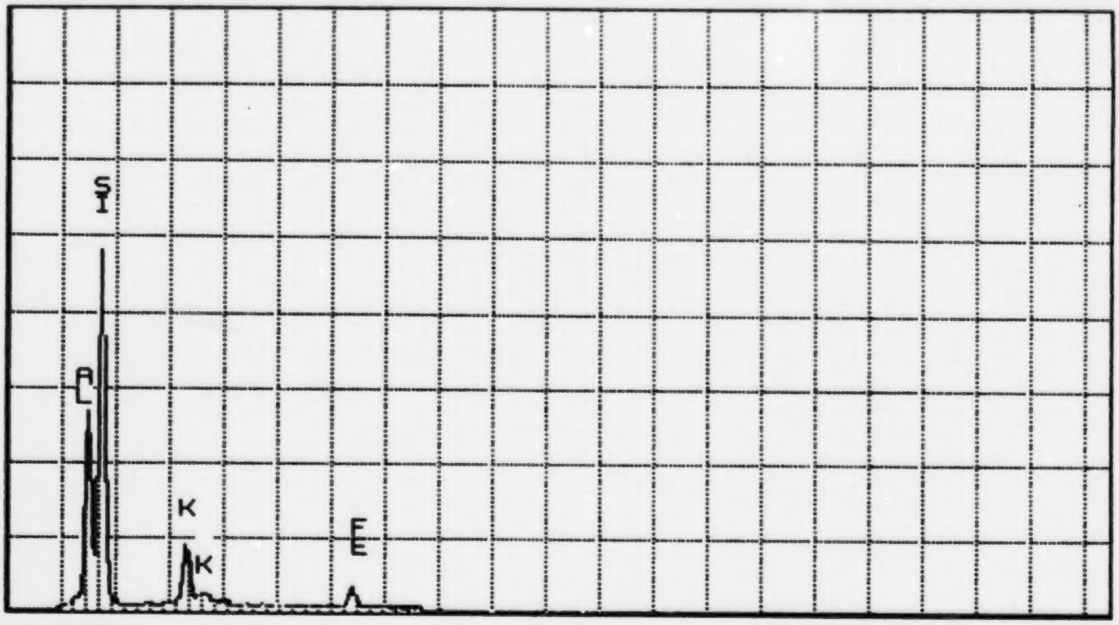

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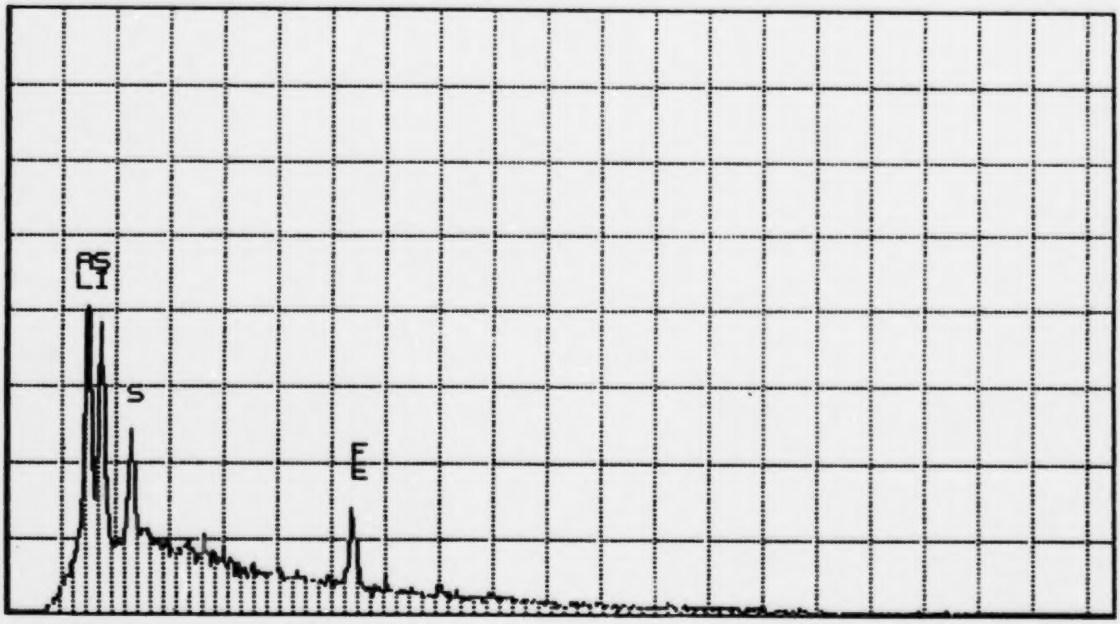

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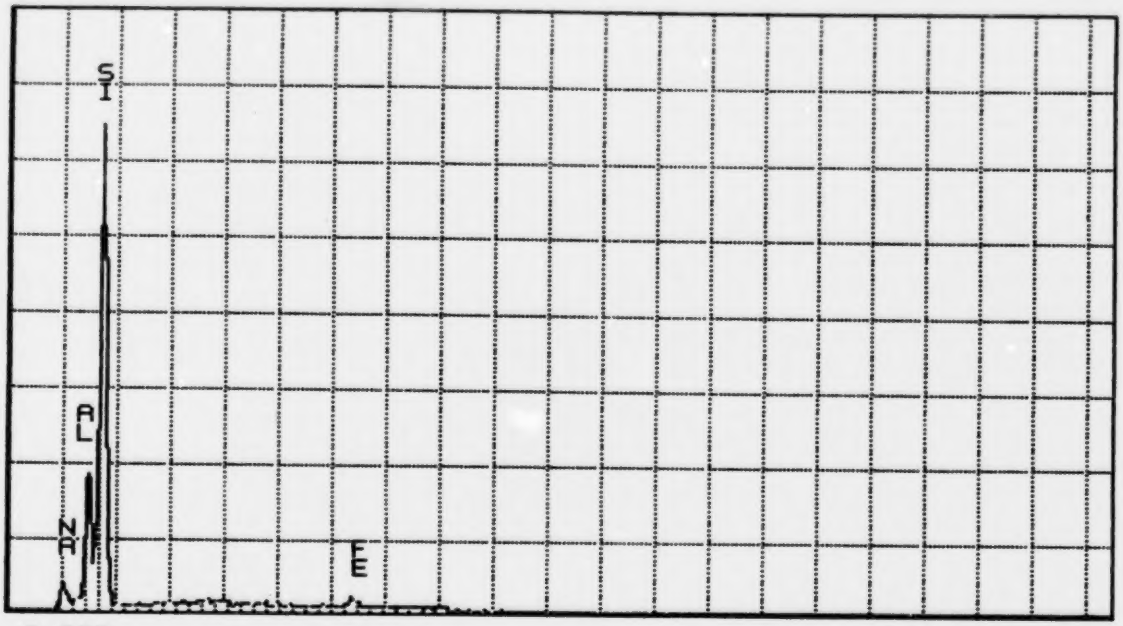

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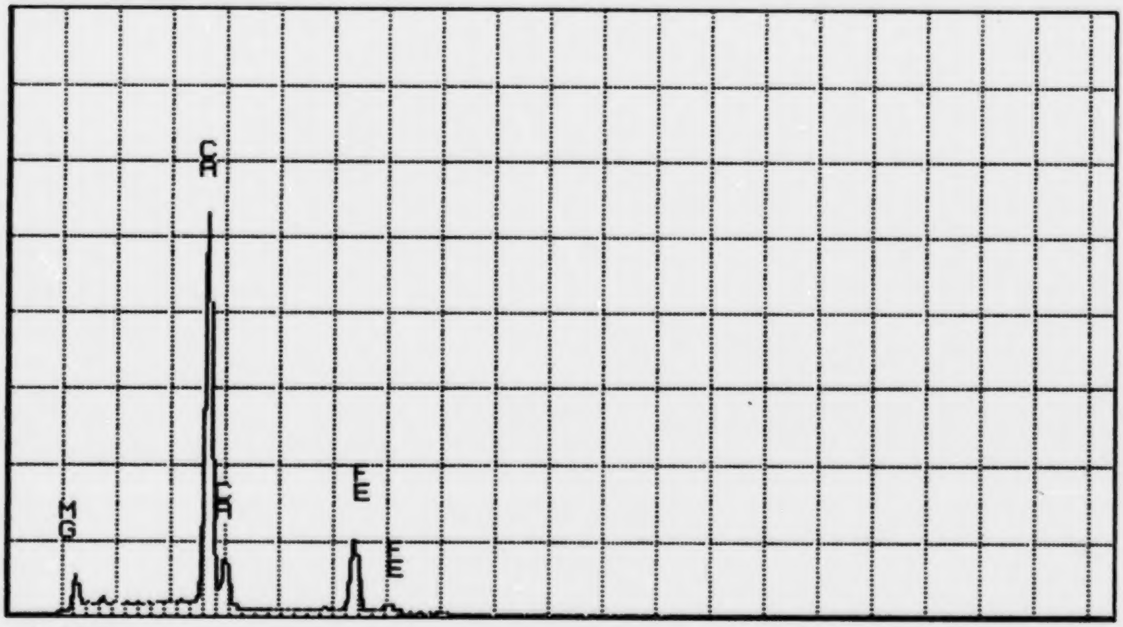

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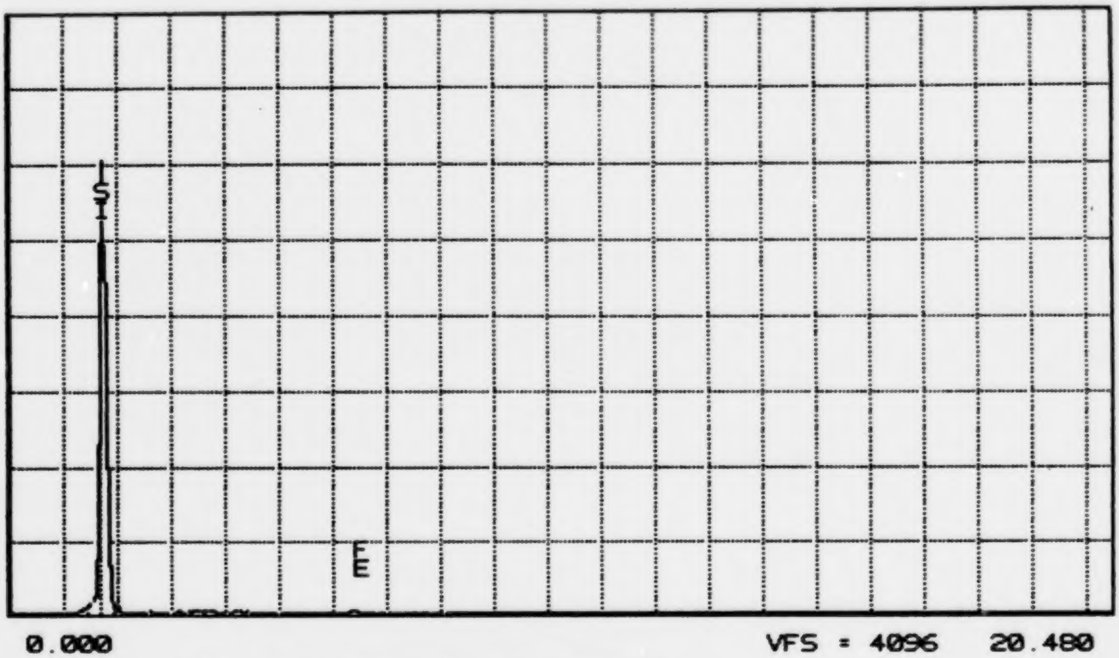

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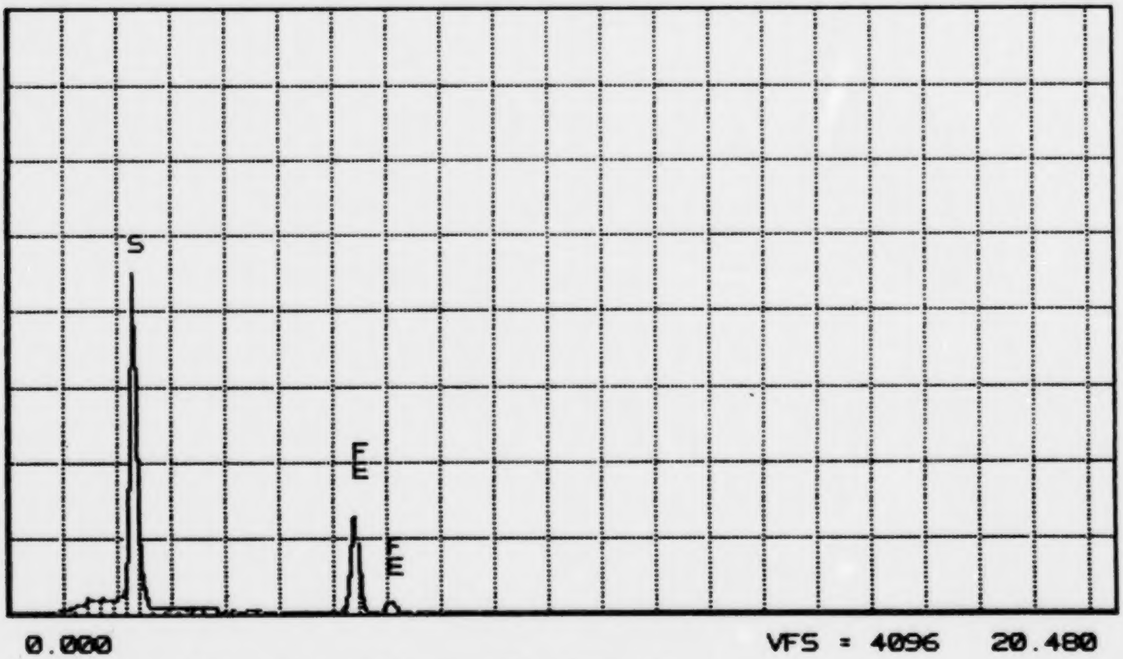

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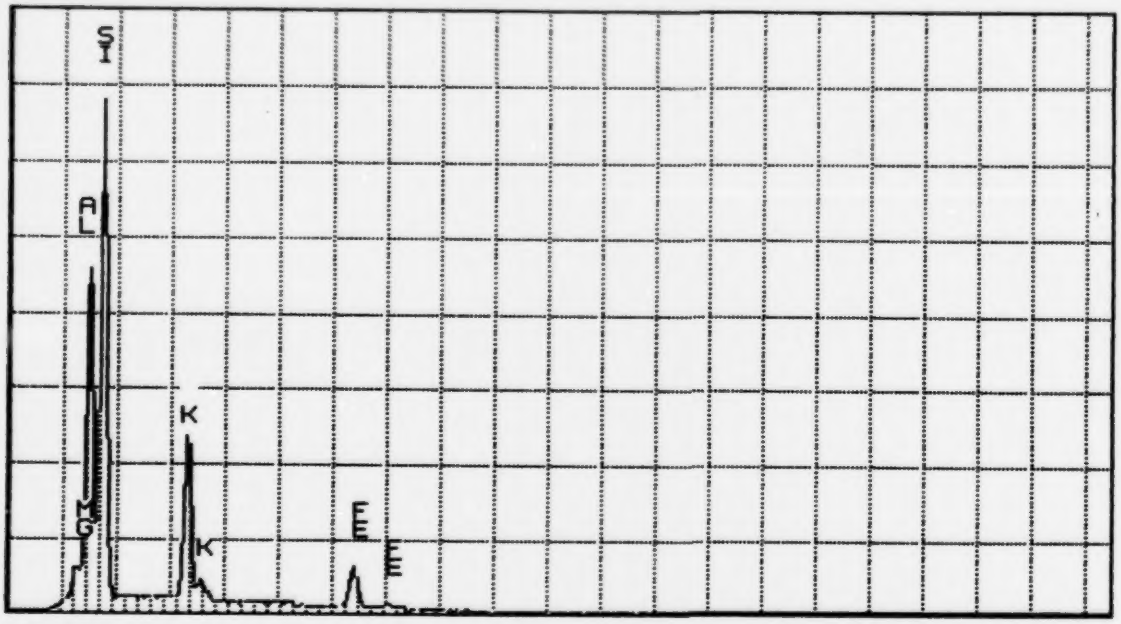

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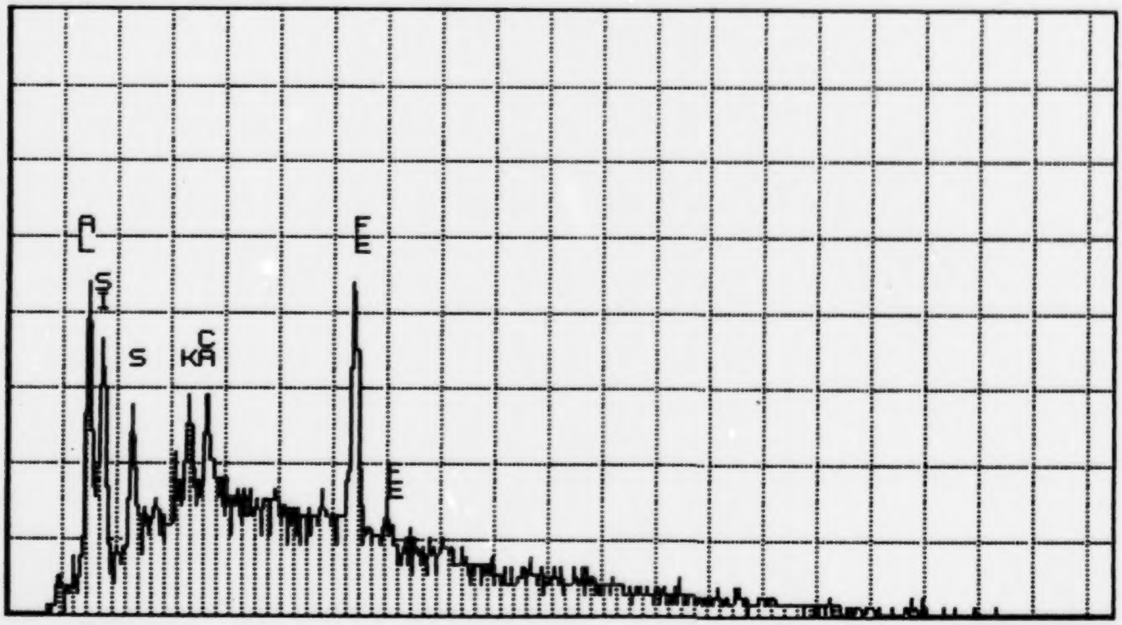

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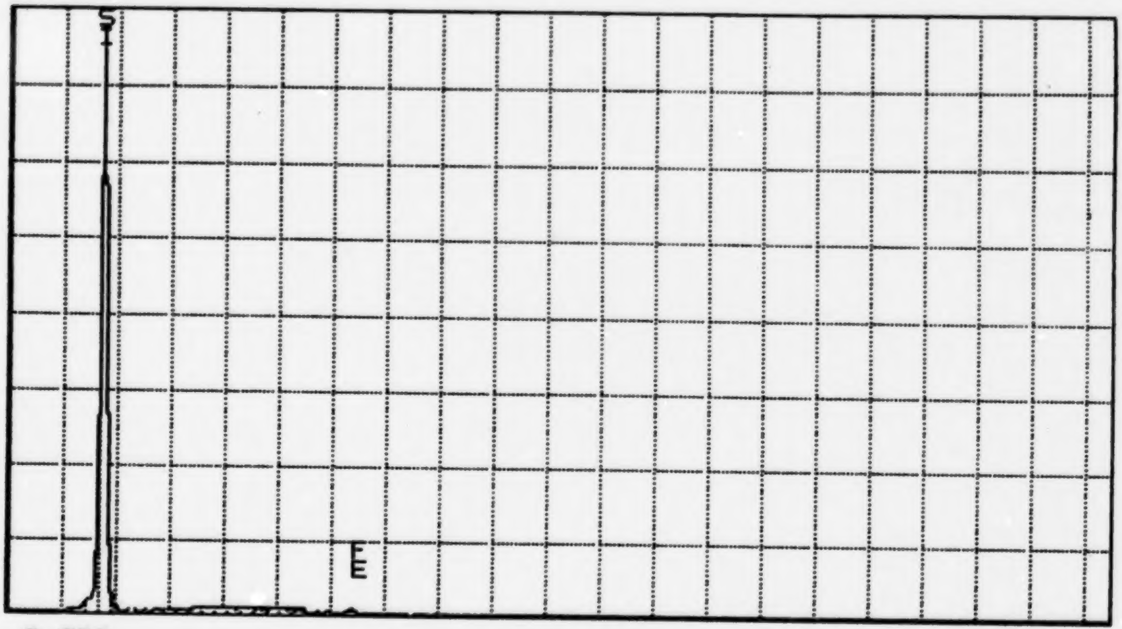

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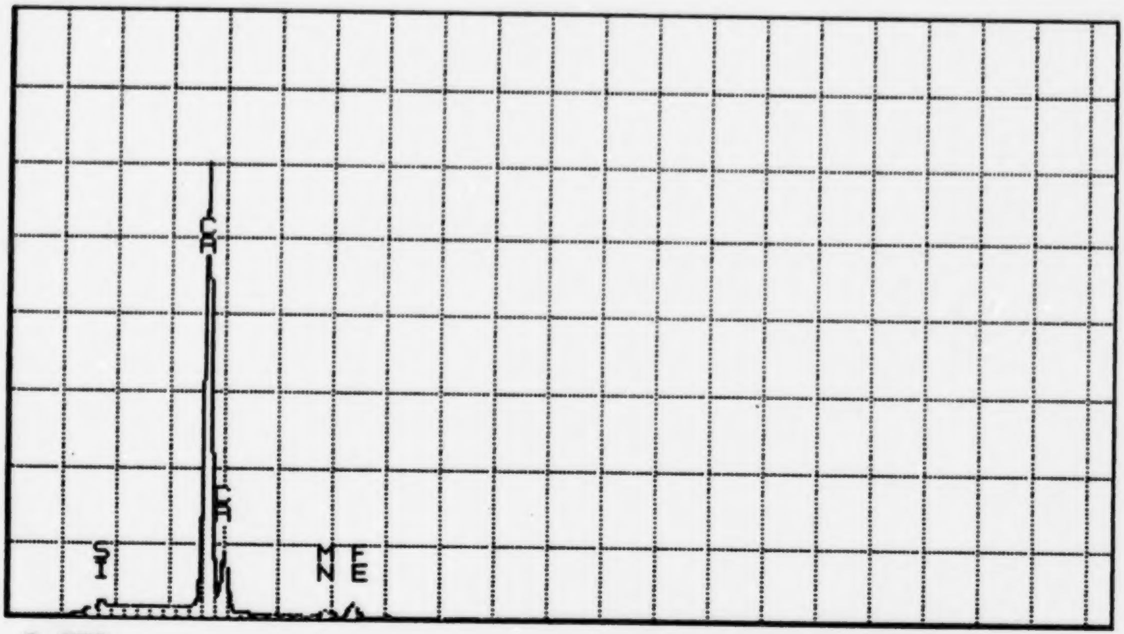

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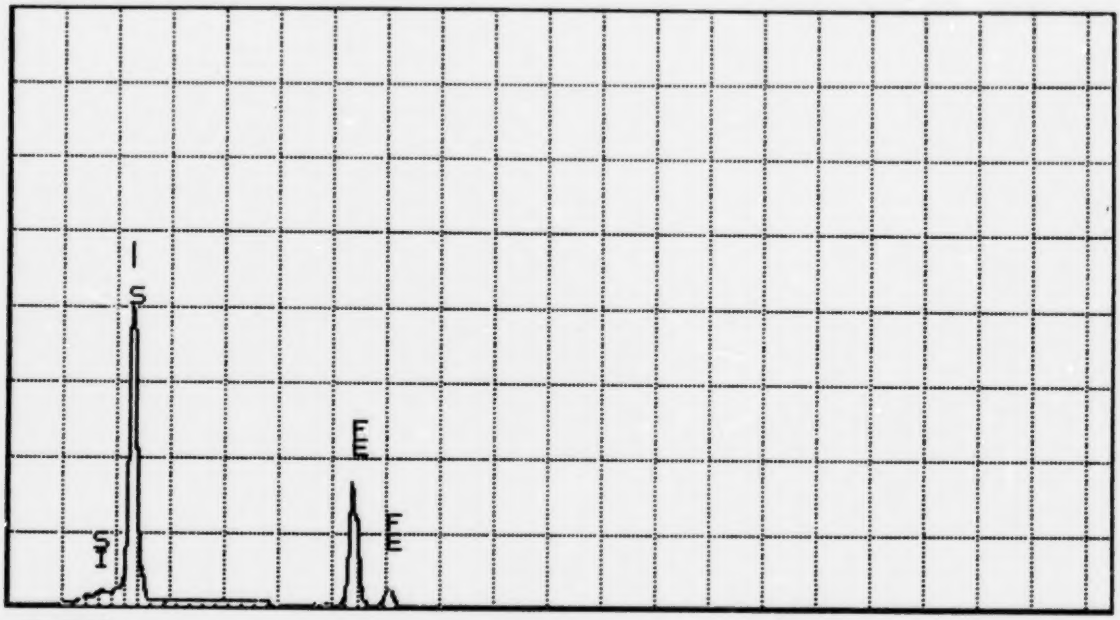

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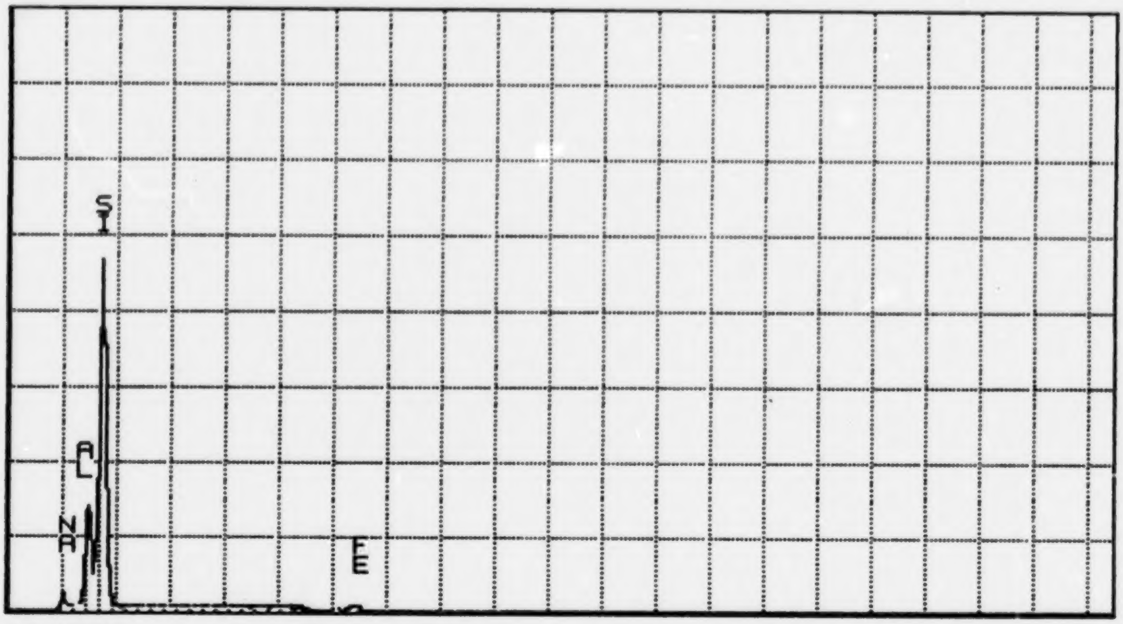

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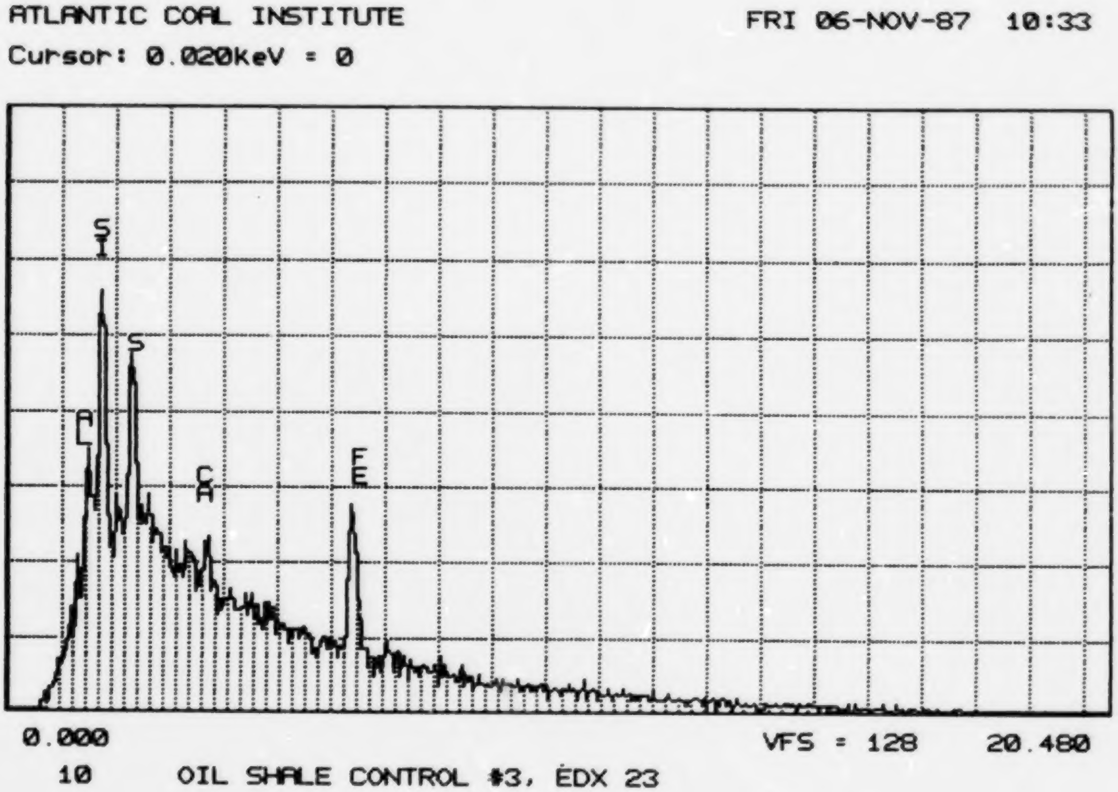

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10 OIL SHALE CONTROL #3, EDX 23

APPENDIX I

ANALYTICAL DATA

K. Scanning Electron Microscopy - Automated Survey

TABLE 1. EDX isomers and peak overlaps; mineral standards and control conditions for the Particle Recognition and Characterization program (PRC).

*1 anhydrite
*2 melanterite, pyrrhotite
*3 serpentine
*4 muscovite, sericite, microcline, orthoclase
*5 fluorite,aragonite
*6 boehmite, diaspore, gibbsite, corundum, chrysoberyl
*7 opal, chalcedony, cristobalite
*8 nacrite, halloysite, topaz, kyanite
*9 penninite, chamosite, clinochlore
*10 orthoclase, illite overlap
*11 magnetite, hematite, lepidocrocite
*12 goethite overlap
*13 anatase
*14 collophane, phosphorite
*15 azurite
*16 P-Zr overlap
*17 orpiment
*18 Mo overlap
*19 bravolite
*20 marcasite
*21 covellite, bornite, chalcocite
*22 pyroxenes, hornblende overlap
*23 poor resolution
*24 andradite, epidote and hornblende overlap
*25 low Si - ankerite/andradite overlap
*26 augite overlap
*27 muscovite, illite overlap
*28 low Pb - realgar overlap
*29 analcime, zeolite

MINERAL STANDARDS:

1. Astimex
2. Chemplex
3. Ward Scientific
4. In-house

CONDITIONS:

1. Grains > 0.5um.
2. Kev = 20.
3. Carbon coated samples.
4. Assume Si,Fe artifacts.
5. Monitor 25 elements.
6. Organic minerals, graphite not detectable.
7. Excludes most hydrated sulphates.

TABLE 2. Interpretative analysis summary of mineral classes and weight percentages for Control #1.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.61	0.17
Kaolinite#8	9	2.74	5.68
Montmorillonite	3	0.91	0.97
Dolomite	10	3.05	1.06
Szomolnokite#2	1	0.30	0.24
Illite#4	50	15.24	14.39
Calcite#5.	30	9.15	12.75
POLISH#6	4	1.22	0.27
Quartz#7	51	15.55	15.34
Tourmaline	5	1.52	0.50
Plagioclase#29	115	35.06	31.93
Biotite#27	1	0.30	0.06
Hornblende#24	11	3.35	3.16
Ankerite#25	8	2.44	8.07
Epidote#24	2	0.61	0.63
Siderite#12	3	0.91	0.33
Apatite#14	2	0.61	0.33
Almandine	3	0.91	0.49
Andradite#24#25	11	3.35	2.74
Sulphur#18	1	0.30	0.03
Pyrite#20	6	1.83	0.84
SUM	328	100	100.00

TABLE 3. Interpretative analysis summary of mineral classes and weight percentages for Control #2.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	3	0.93	1.38
Kaolinite#8	2	0.62	0.32
Dolomite	19	5.92	7.58
Szomolnokite#2	1	0.31	0.12
Illite#4	69	21.50	15.36
Calcite#5.	22	6.85	6.07
POLISH#6	4	1.25	0.51
Quartz#7	51	15.89	15.35
Chlorite#9	2	0.62	0.35
Tourmaline	3	0.93	0.88
Plagioclase#29	99	30.84	29.92
Biotite#27	2	0.62	0.30
Hornblende#24	9	2.80	4.69
Microcline#10	1	0.31	0.09
Ankerite#25	12	3.74	8.39
Epidote#24	4	1.25	1.04
Apatite#14	2	0.62	0.22
Andradite#24#25	11	3.43	2.19
Rutile#13	1	0.31	2.59
Pyrite#20	4	1.25	2.67
SUM	321	100	100.00

TABLE 4. Interpretative analysis summary of mineral classes and weight percentages for Control #3.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Kaolinite#8	5	1.50	0.79
Dolomite	8	2.40	2.22
Szomolnokite#2	4	1.20	0.81
Staurolite	3	0.90	0.38
Illite#4	57	17.12	12.04
Calcite#5.	27	8.11	8.87
POLISH#6	6	1.80	0.93
Quartz#7	41	12.31	13.07
Chlorite#9	1	0.30	0.10
Tourmaline	7	2.10	0.74
Plagioclase#29	115	34.53	34.85
Biotite#27	1	0.30	0.14
Hornblende#24	28	8.41	9.82
Microcline#10	1	0.30	0.09
Ankerite#25	6	1.80	2.27
Epidote#24	10	3.00	1.23
Siderite#12	3	0.90	7.84
Apatite#14	1	0.30	0.09
Andradite#24#25	8	2.40	3.62
Ilmenite	1	0.30	0.09
SUM	333	100	100.00

TABLE 5. Interpretative analysis summary of mineral classes and weight percentages for +2" sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Kaolinite#8	3	0.81	0.33
Dolomite	36	9.70	7.72
Szomolnokite#2	2	0.54	0.59
Illite#4	14	3.77	1.79
Calcite#5.	114	30.73	22.90
POLISH#6	3	0.81	0.56
Quartz#7	41	11.05	11.67
Chlorite#9	3	0.81	0.46
Plagioclase#29	72	19.41	18.73
Hornblende#24	21	5.66	4.26
Diopside#22	1	0.27	0.19
Ankerite#25	11	2.96	2.20
Epidote#24	6	1.62	3.80
Apatite#14	3	0.81	4.63
Andradite#24#25	41	11.05	20.16
SUM	371	100	100

TABLE 6. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1" sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.87	0.22
Kaolinite*8	3	0.87	0.14
Dolomite	5	1.46	1.26
Szomolnokite*2	1	0.29	0.16
Illite*4	50	14.58	10.98
Calcite*5.	39	11.37	20.48
POLISH#6	3	0.87	0.37
Quartz*7	57	16.62	13.14
Chlorite*9	1	0.29	0.26
Tourmaline	4	1.17	0.40
Plagioclase*29	129	37.61	36.97
Biotite*27	1	0.29	0.04
Hornblende*24	6	1.75	1.01
Ankerite*25	5	1.46	0.78
Epidote*24	5	1.46	0.76
Apatite*14	3	0.87	2.17
Almandine	3	0.87	0.38
Andradite*24*25	7	2.04	2.12
Rutile*13	1	0.29	0.10
Sulphur*18	7	2.04	0.64
Pyrite*20	9	2.62	7.51
Chalcopyrite*21	1	0.29	0.12
SUM	343	100	100

TABLE 7. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2" sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.35	1.93
Kaolinite*8	5	1.13	0.52
Dolomite	29	6.53	4.36
Szomolnokite*2	1	0.23	0.28
Illite*4	65	14.64	13.56
Calcite*5.	58	13.06	16.38
POLISH#6	4	0.90	0.35
Quartz*7	47	10.59	12.48
Tourmaline	6	1.35	2.75
Plagioclase*29	138	31.08	30.29
Hornblende*24	24	5.41	3.02
Microcline*10	1	0.23	0.16
Ankerite*25	11	2.48	3.06
Epidote*24	12	2.70	3.58
Siderite*12	1	0.23	0.17
Apatite*14	2	0.45	0.19
Almandine	2	0.45	0.26
Andradite*24*25	23	5.18	4.66
Sulphur*18	2	0.45	0.07
Pyrite*20	7	1.58	1.95
SUM	444	100	100.00

TABLE 8. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.24	1.58
Kaolinite#8	9	2.79	2.74
Dolomite	6	1.86	1.74
Szomolnokite#2	2	0.62	0.62
Staurolite	2	0.62	0.77
Illite#4	57	17.65	11.28
Calcite#5.	29	8.98	10.56
Quartz#7	42	13.00	17.80
Chlorite#9	1	0.31	1.78
Tourmaline	6	1.86	1.02
Plagioclase#29	116	35.91	34.98
Biotite#27	1	0.31	0.05
Hornblende#24	9	2.79	2.08
Ankerite#25	5	1.55	3.41
Epidote#24	2	0.62	0.44
Siderite#12	1	0.31	0.20
Almandine	2	0.62	0.78
Andradite#24#25	16	4.95	4.62
Sulphur#18	7	2.17	1.36
Pyrite#20	6	1.86	2.18
SUM	323	100	100.00

TABLE 9. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.35	0.45
Kaolinite#8	6	2.03	0.68
Montmorillonite	2	0.68	0.20
Dolomite	7	2.36	1.45
Szomolnokite#2	1	0.34	0.03
Illite#4	59	19.93	15.11
Calcite#5.	15	5.07	5.15
POLISH#6	8	2.70	1.88
Quartz#7	41	13.85	18.95
Tourmaline	5	1.69	3.98
Plagioclase#29	105	35.47	32.79
Biotite#27	1	0.34	1.12
Hornblende#24	9	3.04	1.82
Ankerite#25	11	3.72	3.06
Epidote#24	1	0.34	0.13
Siderite#12	1	0.34	0.71
Apatite#14	1	0.34	4.47
Almandine	3	1.01	0.90
Andradite#24#25	10	3.38	4.70
Sulphur#18	2	0.68	0.07
Pyrite#20	4	1.35	2.35
SUM	296	100	100.00

TABLE 10. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	1	0.28	0.15
Kaolinite#8	16	4.43	3.98
Montmorillonite	1	0.28	0.06
Dolomite	7	1.94	1.29
Illite#4	92	25.48	29.09
Calcite#5.	14	3.88	4.44
POLISH#6	5	1.39	0.47
Quartz#7	52	14.40	14.66
Chlorite#9	2	0.55	0.20
Tourmaline	9	2.49	1.34
Plagioclase#29	118	32.69	32.99
Biotite#27	3	0.83	0.21
Hornblende#24	13	3.60	4.47
Ankerite#25	6	1.66	1.19
Epidote#24	4	1.11	1.14
Siderite#12	2	0.55	0.75
Apatite#14	1	0.28	0.44
Almandine	2	0.55	0.52
Andradite#24#25	8	2.22	2.11
Sulphur#18	4	1.11	0.39
Pyrite#20	1	0.28	0.12
SUM	361	100	100.00

TABLE 11. Interpretative analysis summary of mineral classes and weight percentages for: -48m to +200m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Kaolinite#8	7	2.97	1.45
Dolomite	5	2.12	3.48
Szomolnokite#2	3	1.27	1.20
Jarosite	1	0.42	0.07
Staurolite	1	0.42	0.20
Illite#4	49	20.76	20.00
Calcite#5.	25	10.59	21.61
POLISH#6	14	5.93	4.05
Quartz#7	37	15.68	18.34
Tourmaline	3	1.27	0.52
Plagioclase	61	25.85	15.24
Hornblende	10	4.24	5.68
Ankerite	3	1.27	0.60
Epidote	1	0.42	0.11
Siderite#12	1	0.42	0.20
Almandine	1	0.42	0.11
Andradite	3	1.27	1.05
Rutile#13	1	0.42	0.28
Sulphur#18	1	0.42	0.07
Pyrite#20	8	3.39	5.69
Linnaeite	1	0.42	0.07
SUM	236	100	100.00

TABLE 12. Interpretative analysis summary of mineral classes and weight percentages for: -200m to +400m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	1	0.56	0.86
Kaolinite#8	4	2.26	0.89
Dolomite	3	1.69	1.72
Szomolnokite#2	2	1.13	0.40
Jarosite	1	0.56	0.45
Staurolite	4	2.26	0.30
Illite#4	26	14.69	12.53
Calcite#5.	20	11.30	20.33
POLISH#6	4	2.26	0.52
Quartz#7	28	15.82	25.40
Chlorite#9	2	1.13	0.13
Tourmaline	12	6.78	3.72
Plagioclase#29	48	27.12	23.14
Biotite#27	1	0.56	0.16
Hornblende#24	2	1.13	0.10
Ankerite#25	5	2.82	2.71
Siderite#12	1	0.56	0.11
Andradite#24#25	5	2.82	1.68
Rutile#13	1	0.56	0.08
Sulphur#18	2	1.13	1.02
Pyrite#20	4	2.26	3.71
Zircon#16	1	0.56	0.06
SUM	177	100	100.00

TABLE 13. Interpretative analysis summary of mineral classes and weight percentages for: -400m sieve fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Kaolinite#8	13	4.73	1.91
Dolomite	5	1.82	2.20
Szomolnokite#2	2	0.73	0.90
Jarosite	3	1.09	0.69
Staurolite	2	0.73	0.33
Illite#4	52	18.91	12.24
Calcite#5.	23	8.36	13.67
POLISH#6	9	3.27	1.65
Quartz#7	44	16.00	24.40
Chlorite#9	1	0.36	0.07
Tourmaline	9	3.27	2.30
Plagioclase#29	80	29.09	27.71
Hornblende#24	8	2.91	2.91
Microcline#10	1	0.36	1.45
Ankerite#25	2	0.73	1.18
Siderite#12	2	0.73	0.53
Apatite#14	1	0.36	0.28
Almandine	3	1.09	1.48
Andradite#24#25	4	1.45	1.50
Sulphur#18	3	1.09	0.78
Pyrite#20	7	2.55	1.55
Linnaeite	1	0.36	0.27
SUM	275	100	100.00

TABLE 14. Interpretative analysis summary of mineral classes and weight percentages for: +2"; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	6	1.71	1.85
Kaolinite#8	3	0.85	0.30
Montmorillonite	1	0.28	0.08
Dolomite	10	2.85	7.93
Szomolnokite#2	5	1.42	1.56
Staurolite	2	0.57	0.14
Illite#4	73	20.80	17.32
Calcite#5.	10	2.85	3.28
POLISH#6	3	0.85	0.28
Quartz#7	45	12.82	12.80
Tourmaline	9	2.56	1.01
Plagioclase	143	40.74	41.82
Biotite	1	0.28	0.12
Hornblende	3	0.85	1.54
Microcline#10	4	1.14	0.46
Ankerite	13	3.70	2.88
Epidote	2	0.57	0.38
Siderite#12	2	0.57	0.49
Apatite#14	3	0.85	0.38
Almandine	4	1.14	4.68
Andradite	8	2.28	0.67
Sulphur#18	1	0.28	0.04
SUM	351	100	100.00

TABLE 15. Interpretative analysis summary of mineral classes and weight percentages for: +2"; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	6	1.86	0.71
Kaolinite#8	6	1.86	3.38
Dolomite	9	2.79	2.22
Staurolite	1	0.31	0.70
Illite#4	44	13.62	11.10
Calcite#5.	24	7.43	9.40
POLISH#6	1	0.31	0.08
Quartz#7	50	15.48	24.69
Tourmaline	4	1.24	1.26
Plagioclase#29	134	41.49	34.83
Biotite#27	1	0.31	0.09
Hornblende#24	10	3.10	1.65
Ankerite#25	1	0.31	0.11
Epidote#24	1	0.31	0.36
Siderite#12	1	0.31	0.36
Apatite#14	2	0.62	0.58
Almandine	1	0.31	0.40
Andradite#24#25	12	3.72	5.27
Sulphur#18	10	3.10	0.66
Pyrite#20	5	1.55	2.15
SUM	323	100	100.00

TABLE 16. Interpretative analysis summary of mineral classes and weight percentages for: +2" ; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.66	0.24
Kaolinite*8	5	1.66	1.19
Montmorillonite	2	0.66	0.16
Dolomite	8	2.66	0.86
Szomolnokite*2	4	1.33	0.82
Illite*4	47	15.61	12.39
Calcite*5.	14	4.65	3.93
POLISH*6	4	1.33	0.46
Quartz*7	37	12.29	10.65
Chlorite*9	1	0.33	0.05
Tourmaline	2	0.66	0.20
Plagioclase	125	41.53	52.85
Biotite	2	0.66	0.13
Hornblende	7	2.33	1.55
Microcline*10	1	0.33	0.06
Ankerite	7	2.33	1.45
Epidote	6	1.99	5.89
Siderite*12	1	0.33	0.13
Apatite*14	1	0.33	0.07
Almandine	1	0.33	0.10
Andradite	3	1.00	0.39
Rutile*13	1	0.33	0.09
Sulphur*18	13	4.32	3.07
Pyrite*20	7	2.33	3.29
SUM	301	100	100.00

TABLE 17. Interpretative analysis summary of mineral classes and weight percentages for: +2"; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	1	0.22	0.02
Szomolnokite*2	1	0.22	0.03
Illite*4	16	3.47	3.81
Calcite*5.	372	80.69	88.68
Quartz*7	15	3.25	2.28
Tourmaline	2	0.43	0.28
Plagioclase*29	41	8.89	3.30
Hornblende*24	6	1.30	0.93
Ankerite*25	2	0.43	0.11
Siderite*12	1	0.22	0.08
Almandine	1	0.22	0.04
Andradite*24*25	2	0.43	0.37
Pyrite*20	1	0.22	0.09
SUM	461	100	100.00

TABLE 18. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1"; 1.60 Float fraction.

MINERAL CLASS	P.R.C. # 	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	1	0.32	0.03
Kaolinite#8	10	3.18	1.49
Dolomite	1	0.32	0.04
Staurolite	2	0.64	0.34
Illite#4	76	24.20	12.07
Calcite#5.	3	0.96	0.67
POLISH#6	5	1.59	1.06
Quartz#7	45	14.33	11.92
Chlorite#9	1	0.32	0.07
Tourmaline	14	4.46	9.80
Plagioclase	125	39.81	54.14
Hornblende	23	7.32	7.49
Siderite#12	1	0.32	0.03
Apatite#14	1	0.32	0.38
Augite#22	1	0.32	0.03
Almandine	1	0.32	0.11
Andradite	3	0.96	0.29
Pyrite#20	1	0.32	0.03
SUM	314	100	100.00

TABLE 19. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1"; 1.80 Float fraction.

MINERAL CLASS	P.R.C. # 	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	9	2.49	0.58
Kaolinite#8	13	3.59	4.53
Staurolite	1	0.28	0.17
Illite#4	68	18.78	12.34
Calcite#5.	12	3.31	3.65
POLISH#6	3	0.83	0.16
Quartz#7	67	18.51	34.62
Chlorite#9	3	0.83	0.17
Tourmaline	13	3.59	6.16
Plagioclase#29	140	38.67	28.56
Biotite#27	2	0.55	0.04
Hornblende#24	20	5.52	4.91
Diopside#22	1	0.28	0.01
Epidote#24	1	0.28	0.12
Siderite#12	3	0.83	3.27
Apatite#14	1	0.28	0.05
Almandine	1	0.28	0.08
Andradite#24#25	1	0.28	0.03
Rutile#13	1	0.28	0.34
Pyrite#20	2	0.55	0.20
SUM	362	100	100.00

TABLE 20. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1"; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	11	2.77	1.69
Kaolinite#8	2	0.50	0.08
Montmorillonite	1	0.25	0.08
Dolomite	8	2.02	1.26
Szomolnokite#2	1	0.25	0.18
Jarosite	1	0.25	0.14
Staurolite	1	0.25	0.04
Illite#4	43	10.83	13.75
Calcite#5.	67	16.88	18.12
POLISH#6	2	0.50	0.10
Quartz#7	74	18.64	19.75
Tourmaline	6	1.51	0.43
Plagioclase#29	106	26.70	30.91
Biotite#27	2	0.50	0.33
Hornblende#24	19	4.79	2.63
Ankerite#25	2	0.50	1.13
Epidote#24	4	1.01	0.96
Siderite#12	1	0.25	0.04
Apatite#14	2	0.50	0.57
Almandine	2	0.50	1.20
Andradite#24#25	9	2.27	3.58
Sulphur#18	15	3.78	0.68
Pyrite#20	18	4.53	2.37
SUM	397	100	100.00

TABLE 21. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1"; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.03	0.36
Kaolinite#8	2	0.51	0.09
Dolomite	11	2.82	0.57
Staurolite	1	0.26	0.01
Illite#4	73	18.72	8.92
Calcite#5.	22	5.64	6.90
POLISH#6	3	0.77	0.07
Quartz#7	48	12.31	7.41
Tourmaline	6	1.54	0.34
Plagioclase#29	158	40.51	34.05
Biotite#27	2	0.51	0.04
Hornblende#24	17	4.36	4.01
Ankerite#25	8	2.05	2.75
Epidote#24	6	1.54	0.69
Siderite#12	4	1.03	29.78
Apatite#14	1	0.26	0.04
Augite#22	2	0.51	0.02
Almandine	4	1.03	0.46
Andradite#24#25	11	2.82	2.58
Sulphur#18	3	0.77	0.05
Pyrite#20	4	1.03	0.85
SUM	390	100	100.00

TABLE 22. Interpretative analysis summary of mineral classes and weight percentages for: -2" to +1"; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	7	1.46	1.38
Kaolinite#8	3	0.63	0.88
Montmorillonite	2	0.42	0.06
Dolomite	37	7.74	5.93
Illite#4	66	13.81	12.65
Calcite#5.	9	1.88	0.99
Quartz#7	57	11.92	11.10
Chlorite#9	1	0.21	0.02
Plagioclase#29	193	40.38	28.97
Hornblende#24	27	5.65	4.65
Diopside#22	3	0.63	0.70
Ankerite#25	9	1.88	3.00
Epidote#24	7	1.46	0.27
Siderite#12	1	0.21	0.03
Apatite#14	2	0.42	0.13
Augite#22	1	0.21	0.03
Almandine	1	0.21	0.03
Andradite#24#25	38	7.95	23.29
Rutile#13	1	0.21	0.07
Halite	1	0.21	0.02
Ilmenite	1	0.21	3.99
Sulphur#18	6	1.26	0.31
Pyrite#20	5	1.05	1.51
SUM	478	100	100.00

TABLE 23. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 1.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	5	1.15	2.18
Kaolinite#8	4	0.92	3.57
Montmorillonite	1	0.23	0.09
Dolomite	2	0.46	0.45
Illite#4	117	26.90	16.76
Calcite#5.	20	4.60	2.15
POLISH#6	3	0.69	0.08
Quartz#7	72	16.55	10.47
Tourmaline	24	5.52	15.52
Plagioclase#29	134	30.80	36.21
Biotite#27	2	0.46	0.07
Hornblende#24	29	6.67	4.68
Epidote#24	2	0.46	0.09
Siderite#12	1	0.23	0.02
Apatite#14	2	0.46	0.06
Almandine	4	0.92	3.78
Andradite#24#25	10	2.30	3.66
Sulphur#18	1	0.23	0.01
Pyrite#20	2	0.46	0.14
SUM	435	100	100.00

TABLE 24. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 1.80 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.21	0.32
Kaolinite#8	17	5.15	3.77
Montmorillonite	1	0.30	0.05
Dolomite	4	1.21	1.07
Jarosite	1	0.30	0.49
Staurolite	2	0.61	0.27
Illite#4	73	22.12	29.47
Calcite#5.	17	5.15	6.52
POLISH#6	2	0.61	0.04
Quartz#7	46	13.94	10.69
Chlorite#9	3	0.91	0.17
Tourmaline	19	5.76	2.69
Plagioclase#29	82	24.85	23.77
Biotite#27	1	0.30	0.35
Hornblende#24	38	11.52	14.50
Epidote#24	1	0.30	0.06
Siderite#12	2	0.61	0.18
Apatite#14	1	0.30	0.03
Augite#22	1	0.30	0.25
Almandine	8	2.42	3.67
Andradite#24#25	2	0.61	0.47
Rutile#13	1	0.30	0.27
Sulphur#18	1	0.30	0.01
Pyrite#20	3	0.91	0.89
SUM	330	100	100.00

TABLE 25. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	3	0.66	0.25
Kaolinite#8	12	2.62	1.68
Dolomite	6	1.31	0.63
Szomolnokite#2	2	0.44	0.87
Jarosite	1	0.22	0.14
Illite#4	99	21.62	24.19
Calcite#5.	36	7.86	7.63
POLISH#6	3	0.66	0.20
Quartz#7	60	13.10	11.28
Tourmaline	20	4.37	2.55
Plagioclase#29	170	37.12	43.05
Biotite#27	2	0.44	0.46
Hornblende#24	27	5.90	4.42
Apatite#14	2	0.44	0.20
Almandine	6	1.31	1.44
Andradite#24#25	3	0.66	0.73
Sulphur#18	2	0.44	0.07
Pyrite#20	4	0.87	0.20
SUM	458	100	100.00

TABLE 26. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	9	2.74	2.39
Kaolinite#8	8	2.43	1.12
Dolomite	3	0.91	0.52
Szomolnokite#2	1	0.30	0.05
Illite#4	52	15.81	9.25
Calcite#5.	31	9.42	8.70
POLISH#6	1	0.30	0.04
Quartz#7	37	11.25	15.44
Chlorite#9	1	0.30	0.03
Tourmaline	8	2.43	0.68
Plagioclase#29	139	42.25	48.25
Hornblende#24	18	5.47	7.42
Microcline#10	1	0.30	0.16
Ankerite#25	2	0.61	2.84
Epidote#24	4	1.22	0.63
Andradite#24#25	8	2.43	1.38
Sulphur#18	1	0.30	0.14
Pyrite#20	5	1.52	0.99
SUM	329	100	100.00

TABLE 27. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	7	2.95	2.15
Kaolinite#8	1	0.42	1.64
Dolomite	3	1.27	0.33
Szomolnokite#2	2	0.84	0.85
Illite#4	41	17.30	15.14
Calcite#5.	5	2.11	4.13
POLISH#6	1	0.42	0.17
Quartz#7	15	6.33	4.94
Chlorite#9	3	1.27	0.79
Tourmaline	3	1.27	0.29
Plagioclase#29	100	42.19	47.78
Biotite	2	0.84	0.11
Hornblende#24	19	8.02	5.90
Ankerite#25	4	1.69	6.42
Epidote#24	4	1.69	2.06
Siderite#12	1	0.42	0.12
Apatite#14	2	0.84	1.04
Augite#22	1	0.42	0.02
Almandine	1	0.42	0.07
Andradite#24#25	11	4.64	1.85
Rutile#13	1	0.42	0.17
Pyrite#20	9	3.80	4.00
Linnaeite	1	0.42	0.02
SUM	237	100	100.00

TABLE 28. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	0.72	0.17
Dolomite	31	5.60	1.35
Illite#4	9	1.62	0.27
Calcite#5.	356	64.26	87.67
POLISH#6	1	0.18	0.03
Quartz#7	20	3.61	0.96
Tourmaline	1	0.18	0.02
Plagioclase#29	81	14.62	4.76
Hornblende#24	11	1.99	0.60
Ankerite#25	2	0.36	0.41
Epidote#24	5	0.90	0.38
Apatite#14	1	0.18	0.01
Augite#22	1	0.18	0.02
Andradite#24#25	29	5.23	3.34
Sulphur#18	1	0.18	0.01
Pyrite#20	1	0.18	0.02
SUM	554	100	100.00

TABLE 29. Interpretative analysis summary of mineral classes and weight percentages for: -1" to +1/2"; 2.60 Sink fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	81	18.00	4.81
Illite#4	3	0.67	0.17
Calcite#5.	144	32.00	61.67
Quartz#7	3	0.67	0.14
Plagioclase#29	9	2.00	5.60
Hornblende#24	1	0.22	0.11
Andradite#24#25	1	0.22	0.05
Sulphur#18	114	25.33	8.65
Pyrite#20	94	20.89	18.82
SUM	450	100	100.00

TABLE 30. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 1.60 Float fraction.

MINERAL CLASS	P.R.C. %	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	1	0.40	0.05
Kaolinite#8	4	1.59	0.88
Szomolnokite#2	1	0.40	0.12
Jarosite	1	0.40	0.11
Illite#4	43	17.06	20.70
Calcite#5.	14	5.56	4.57
Quartz#7	90	35.71	40.00
Tourmaline	11	4.37	2.00
Plagioclase#29	64	25.40	23.87
Biotite#27	1	0.40	0.11
Hornblende#24	10	3.97	5.12
Siderite#12	2	0.79	0.50
Apatite#14	1	0.40	0.06
Almandine	5	1.98	1.51
Rutile#13	1	0.40	0.10
Pyrite#20	3	1.19	0.29
SUM	252	100	100.00

TABLE 31. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 1.80 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.22	1.13
Kaolinite#8	9	2.74	1.23
Montmorillonite	1	0.30	0.02
Dolomite	1	0.30	0.21
Szomolnokite#2	2	0.61	0.05
Illite#4	63	19.21	17.75
Calcite#5.	14	4.27	2.61
POLISH#6	2	0.61	0.13
Quartz#7	61	18.60	30.95
Chlorite#9	2	0.61	0.23
Tourmaline	15	4.57	1.72
Plagioclase#29	112	34.15	30.81
Biotite#27	1	0.30	0.03
Hornblende#24	27	8.23	8.02
Microcline#10	1	0.30	0.59
Ankerite#25	3	0.91	0.45
Apatite#14	2	0.61	0.60
Almandine	3	0.91	0.50
Andradite#24#25	3	0.91	1.05
Pyrite#20	2	0.61	1.90
SUM	328	100	100.00

TABLE 32. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Kaolinite#8	6	1.52	3.48
Szomolnokite#2	4	1.01	0.39
Jarosite	2	0.51	1.01
Illite#4	55	13.89	10.53
Calcite#5.	40	10.10	10.41
POLISH#6	1	0.25	0.04
Quartz#7	100	25.25	28.37
Chlorite#9	2	0.51	0.22
Tourmaline	8	2.02	1.87
Plagioclase#29	120	30.30	25.84
Biotite#27	2	0.51	0.18
Hornblende#24	9	2.27	1.92
Microcline#10	2	0.51	1.62
Boethite#11	1	0.25	0.04
Ankerite#25	2	0.51	0.11
Epidote#24	1	0.25	0.16
Siderite#12	5	1.26	0.81
Apatite#14	6	1.52	0.82
Almandine	5	1.26	3.95
Andradite#24#25	3	0.76	5.48
Rutile#13	3	0.76	0.69
Sulphur#18	9	2.27	0.62
Pyrite#20	8	2.02	1.20
Linnamite	2	0.51	0.24
SUM	396	100	100.00

TABLE 33. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.10	0.53
Kaolinite#8	7	1.92	2.28
Dolomite	7	1.92	1.51
Jarosite	1	0.27	3.36
Staurolite	2	0.55	0.48
Illite#4	60	16.44	12.64
Calcite#5.	25	6.85	9.52
POLISH#6	1	0.27	0.02
Quartz#7	37	10.14	11.01
Chlorite#9	1	0.27	0.05
Tourmaline	5	1.37	1.48
Plagioclase#29	153	41.92	38.48
Biotite#27	3	0.82	0.17
Hornblende#24	25	6.85	7.55
Microcline#10	2	0.55	0.29
Ankerite#25	7	1.92	1.76
Epidote#24	2	0.55	0.13
Apatite#14	1	0.27	0.71
Almandine	4	1.10	3.61
Andradite#24#25	8	2.19	1.94
Rutile#13	1	0.27	0.14
Sulphur#18	1	0.27	0.05
Pyrite#20	7	1.92	2.20
Linnaeite	1	0.27	0.08
SUM	365	100	100.00

TABLE 34. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.52	1.93
Kaolinite#8	5	1.29	0.42
Montmorillonite	1	0.26	0.15
Dolomite	13	3.35	9.88
Illite#4	57	14.69	10.31
Calcite#5.	38	9.79	20.49
POLISH#6	1	0.26	0.02
Quartz#7	44	11.34	9.69
Tourmaline	2	0.52	0.03
Plagioclase#29	144	37.11	28.16
Biotite#27	2	0.52	0.07
Hornblende#24	16	4.12	2.27
Ankerite#25	11	2.84	5.15
Epidote#24	7	1.80	1.01
Siderite#12	2	0.52	0.49
Apatite#14	2	0.52	0.14
Sphene	1	0.26	0.08
Almandine	1	0.26	0.03
Andradite#24#25	28	7.22	6.98
Rutile#13	1	0.26	1.09
Sulphur#18	4	1.03	0.11
Pyrite#20	6	1.55	1.52
SUM	388	100	100.00

TABLE 35. Interpretative analysis summary of mineral classes and weight percentages for: -1/2" to +4m; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	9	2.23	0.33
Montmorillonite	1	0.25	0.02
Dolomite	27	6.68	1.83
Illite#4	12	2.97	1.00
Calcite#5.	163	40.35	69.18
POLISH#6	1	0.25	0.07
Quartz#7	25	6.19	4.47
Plagioclase#29	86	21.29	10.51
Hornblende#24	16	3.96	1.13
Diopside#22	1	0.25	0.02
Ankerite#25	4	0.99	1.76
Epidote#24	8	1.98	0.77
Almandine	1	0.25	0.03
Andradite#24#25	42	10.40	8.42
Rutile#13	2	0.50	0.24
Sulphur#18	4	0.99	0.08
Pyrite#20	2	0.50	0.12
SUM	404	100	100.00

TABLE 36. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m; 1.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	1	0.34	0.06
Kaolinite#8	16	5.42	10.18
Illite#4	36	12.20	23.57
Calcite#5.	7	2.37	0.72
Quartz#7	106	35.93	31.00
Chlorite#9	2	0.68	0.14
Tourmaline	7	2.37	0.86
Plagioclase#29	102	34.58	28.65
Biotite#27	1	0.34	0.05
Siderite#12	1	0.34	0.41
Apatite#14	9	3.05	3.87
Rutile#13	2	0.68	0.20
Sulphur#18	4	1.36	0.13
Pyrite#20	1	0.34	0.14
SUM	295	100	100.00

TABLE 37. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m; 1.80 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	1.32	1.64
Kaolinite#8	8	2.63	1.31
Dolomite	1	0.33	0.03
Szomolnokite#2	4	1.32	1.42
Illite#4	72	23.68	26.56
Calcite#5.	11	3.62	4.18
POLISH#6	1	0.33	0.09
Quartz#7	58	19.08	17.43
Chlorite#9	1	0.33	0.04
Tourmaline	8	2.63	1.29
Plagioclase#29	89	29.28	26.09
Biotite#27	4	1.32	0.33
Hornblende#24	24	7.89	12.15
Diopside#22	1	0.33	0.05
Ankerite#25	2	0.66	0.17
Epidote#24	2	0.66	0.08
Siderite#12	1	0.33	3.81
Apatite#14	3	0.99	1.40
Augite#22	1	0.33	0.05
Almandine	2	0.66	0.94
Andradite#24#25	3	0.99	0.57
Pyrite#20	4	1.32	0.37
SUM	304	100	100.00

TABLE 38. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	3	0.97	1.69
Kaolinite#8	5	1.62	6.44
Dolomite	2	0.65	0.16
Illite#4	80	25.89	31.77
Calcite#5.	9	2.91	3.83
Quartz#7	49	15.86	15.34
Chlorite#9	1	0.32	0.26
Tourmaline	9	2.91	0.63
Plagioclase#29	113	36.57	17.49
Biotite#27	1	0.32	0.02
Hornblende#24	17	5.50	7.07
Ankerite#25	3	0.97	5.14
Epidote#24	1	0.32	0.13
Siderite#12	2	0.65	1.39
Apatite#14	3	0.97	5.59
Augite#22	1	0.32	0.08
Almandine	1	0.32	2.01
Andradite#24#25	2	0.65	0.53
Sulphur#18	2	0.65	0.05
Pyrite#20	4	1.29	0.31
Cassiterite	1	0.32	0.08
SUM	309	100	100.00

TABLE 39. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	3	0.93	0.50
Kaolinite#8	3	0.93	0.27
Montmorillonite	1	0.31	0.03
Dolomite	3	0.93	1.97
Illite#4	85	26.32	34.09
Calcite#5.	19	5.88	6.07
POLISH#6	1	0.31	0.20
Quartz#7	40	12.38	13.50
Tourmaline	11	3.41	2.50
Plagioclase#29	115	35.60	25.08
Hornblende#24	9	2.79	1.72
Goethite#11	1	0.31	0.17
Ankerite#25	4	1.24	0.84
Epidote#24	2	0.62	5.50
Siderite#12	1	0.31	0.29
Apatite#14	4	1.24	0.53
Almandine	2	0.62	0.14
Andradite#24#25	9	2.79	4.43
Sulphur#18	6	1.86	0.20
Pyrite#20	4	1.24	1.98
SUM	323	100	100.00

TABLE 40. Interpretative analysis summary of mineral classes and weight percentages for: -4m to +10m; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	17	3.32	1.69
Dolomite	60	11.72	8.00
Illite*4	20	3.91	2.58
Calcite*5.	136	26.56	29.08
POLISH*6	1	0.20	0.08
Quartz*7	45	8.79	13.19
Tourmaline	2	0.39	0.34
Plagioclase*29	127	24.80	13.74
Hornblende*24	14	2.73	4.52
Microcline*10	1	0.20	0.18
Ankerite*25	8	1.56	2.83
Epidote*24	12	2.34	0.97
Apatite*14	4	0.78	0.52
Almandine	2	0.39	0.07
Andradite*24*25	54	10.55	20.91
Sulphur*18	3	0.59	0.16
Pyrite*20	6	1.17	1.16
SUM	512	100	100.00

TABLE 41. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 1.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	2.47	1.14
Kaolinite*8	3	1.23	0.18
Dolomite	1	0.41	0.03
Szomolnokite*2	2	0.82	8.14
Staurolite	2	0.82	0.15
Illite*4	41	16.87	26.37
Calcite*5.	12	4.94	1.61
POLISH*6	5	2.06	0.17
Quartz*7	62	25.51	12.03
Chlorite*9	1	0.41	0.02
Tourmaline	7	2.88	2.92
Plagioclase*29	68	27.98	31.12
Hornblende*24	18	7.41	13.93
Epidote*24	2	0.82	0.35
Siderite*12	1	0.41	0.13
Apatite*14	1	0.41	0.05
Augite*22	1	0.41	0.03
Almandine	1	0.41	0.11
Andradite*24*25	4	1.65	1.08
Sulphur*18	3	1.23	0.14
Pyrite*20	2	0.82	0.29
SUM	243	100	100.00

TABLE 42. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 1.80 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	26	13.68	5.10
Kaolinite*8	3	1.58	0.37
Dolomite	2	1.05	5.56
Illite*4	32	16.84	17.22
Calcite*5.	8	4.21	1.18
POLISH#6	3	1.58	0.19
Quartz*7	41	21.58	11.95
Tourmaline	9	4.74	17.98
Plagioclase*29	43	22.63	24.19
Hornblende*24	9	4.74	8.68
Apatite*14	1	0.53	0.03
Almandine	1	0.53	0.03
Andradite*24*25	4	2.11	1.11
Halite	1	0.53	0.01
Sulphur*18	3	1.58	0.27
Pyrite*20	3	1.58	5.61
Chalcopyrite*21	1	0.53	0.52
SUM	190	100	100.00

TABLE 43. Interpretative analysis summary of mineral classes and weight percentages for: -10m to 48m; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	1	0.28	0.03
Kaolinite*8	10	2.83	2.20
Dolomite	5	1.42	0.47
Jarosite	1	0.28	0.12
Staurolite	1	0.28	0.39
Illite*4	82	23.23	14.53
Calcite*5.	13	3.68	2.04
POLISH#6	1	0.28	0.04
Quartz*7	63	17.85	17.07
Chlorite*9	3	0.85	0.14
Tourmaline	14	3.97	12.31
Plagioclase*29	121	34.28	35.82
Hornblende*24	22	6.23	10.54
Ankerite*25	2	0.57	1.82
Epidote*24	1	0.28	0.03
Almandine	2	0.57	0.09
Andradite*24*25	3	0.85	1.61
Rutile*13	1	0.28	0.15
Pyrite*20	7	1.98	0.59
SUM	353	100	100.00

TABLE 44. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	1	0.34	0.05
Kaolinite#8	4	1.37	0.72
Dolomite	1	0.34	0.12
Szomolnokite#2	2	0.68	3.91
Illite#4	60	20.55	20.74
Calcite#5.	11	3.77	1.52
POLISH#6	1	0.34	0.03
Quartz#7	61	20.89	21.66
Tourmaline	4	1.37	1.18
Plagioclase#29	121	41.44	32.54
Hornblende#24	7	2.40	10.00
Ankerite#25	2	0.68	5.38
Epidote#24	1	0.34	0.13
Apatite#14	1	0.34	0.60
Almandine	6	2.05	0.71
Andradite#24#25	2	0.68	0.09
Ilmenite	1	0.34	0.29
Sulphur#18	3	1.03	0.12
Pyrite#20	3	1.03	0.22
SUM	292	100	100.00

TABLE 45. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 2.40 Float Fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	2	0.53	0.18
Kaolinite#8	12	3.18	1.03
Dolomite	7	1.86	1.66
Szomolnokite#2	1	0.27	0.45
Illite#4	113	29.97	20.63
Calcite#5.	20	5.31	15.43
POLISH#6	1	0.27	0.15
Quartz#7	45	11.94	6.89
Chlorite#9	1	0.27	0.03
Tourmaline	11	2.92	2.57
Plagioclase#29	136	36.07	40.32
Biotite#27	1	0.27	0.08
Hornblende#24	10	2.65	1.30
Ankerite#25	4	1.06	0.70
Almandine	1	0.27	0.05
Andradite#24#25	8	2.12	0.68
Pyrite#20	4	1.06	7.83
SUM	377	100	100.00

TABLE 46. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	7	2.19	1.20
Kaolinite#8	4	1.25	0.21
Dolomite	12	3.76	1.66
Szomolnokite#2	2	0.63	0.54
Jarosite	1	0.31	4.34
Staurolite	1	0.31	0.02
Illite#4	40	12.54	12.12
Calcite#5.	32	10.03	25.07
POLISH#6	4	1.25	0.82
Quartz#7	43	13.48	14.59
Chlorite#9	1	0.31	0.01
Tourmaline	5	1.57	0.47
Plagioclase#29	115	36.05	31.63
Hornblende#24	17	5.33	2.40
Diopside#22	1	0.31	0.02
Ankerite#25	2	0.63	0.46
Epidote#24	3	0.94	0.17
Apatite#14	2	0.63	0.19
Almandine	5	1.57	0.40
Andradite#24#25	14	4.39	2.77
Rutile#13	1	0.31	0.19
Sulphur#18	2	0.63	0.06
Pyrite#20	5	1.57	0.65
SUM	319	100	100.00

TABLE 47. Interpretative analysis summary of mineral classes and weight percentages for: -10m to +48m; 2.60 Sink fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	12	2.82	0.34
Dolomite	34	8.00	7.62
Illite#4	15	3.53	0.99
Calcite#5.	174	40.94	57.77
POLISH#6	1	0.24	0.02
Quartz#7	47	11.06	6.90
Tourmaline	2	0.47	0.03
Plagioclase#29	60	14.12	3.28
Hornblende#24	13	3.06	0.68
Goethite#11	1	0.24	2.01
Ankerite#25	6	1.41	1.63
Epidote#24	9	2.12	0.44
Siderite#12	2	0.47	0.37
Apatite#14	5	1.18	12.04
Sphene	1	0.24	0.02
Almandine	1	0.24	0.18
Andradite#24#25	24	5.65	4.30
Rutile#13	1	0.24	0.27
Sulphur#18	9	2.12	0.29
Pyrite#20	8	1.88	0.83
SUM	425	100	100.00

TABLE 48. Interpretative analysis summary of mineral classes and weight percentages for: -48m to +200m; 2.00 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	4	2.41	0.35
Kaolinite#8	5	3.01	0.55
Montmorillonite	1	0.60	0.02
Dolomite	1	0.60	0.12
Illite#4	41	24.70	19.38
Calcite#5.	9	5.42	11.17
POLISH#6	4	2.41	0.33
Quartz#7	27	16.27	10.48
Chlorite#9	1	0.60	0.01
Tourmaline	7	4.22	12.35
Plagioclase#29	47	28.31	23.39
Biotite#27	2	1.20	0.07
Hornblende#24	7	4.22	1.43
Rhodochrosite	1	0.60	10.34
Siderite#12	1	0.60	3.60
Apatite#14	2	1.20	0.18
Almandine	2	1.20	2.81
Andradite#24#25	2	1.20	2.69
Pyrite#20	2	1.20	0.71
SUM	166	100	100.00

TABLE 49. Interpretative analysis summary of mineral classes and weight percentages for: -48m to +200m; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	2	1.04	0.03
Kaolinite#8	5	2.60	2.66
Talc#3	1	0.52	0.04
Dolomite	1	0.52	0.01
Staurolite	3	1.56	1.19
Illite#4	66	34.38	45.31
Calcite#5.	2	1.04	0.24
POLISH#6	1	0.52	0.49
Quartz#7	25	13.02	16.43
Tourmaline	10	5.21	1.73
Plagioclase#29	63	32.81	22.05
Biotite#27	1	0.52	0.04
Hornblende#24	7	3.65	6.65
Epidote#24	2	1.04	2.51
Apatite#14	1	0.52	0.25
Sulphur#18	1	0.52	0.29
Pyrite#20	1	0.52	0.08
SUM	192	100	100.00

TABLE 50. Interpretative analysis summary of mineral classes and weight percentages for -48 to +200m; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Kaolinite*8	13	3.50	1.42
Montmorillonite	1	0.27	0.01
Dolomite	1	0.27	0.08
Szomolnokite*2	2	0.54	0.35
Illite*4	101	27.22	38.17
Calcite*5.	7	1.89	3.13
Quartz*7	49	13.21	8.21
Tourmaline	15	4.04	8.65
Plagioclase*29	140	37.74	29.15
Biotite*27	1	0.27	0.31
Hornblende*24	17	4.58	6.64
Ankerite*25	2	0.54	1.08
Siderite*12	2	0.54	0.07
Apatite*14	1	0.27	0.08
Augite*22	1	0.27	0.04
Almandine	1	0.27	0.20
Andradite*24*25	6	1.62	1.45
Rutile*13	2	0.54	0.44
Sulphur*18	3	0.81	0.06
Pyrite*20	6	1.62	0.47
SUM	371	100	100.00

TABLE 51. Interpretative analysis summary of mineral classes and weight percentages for: -48m to +200m; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.92	0.21
Kaolinite*8	9	2.88	2.64
Dolomite	2	0.64	5.52
Jarosite	1	0.32	0.08
Illite*4	77	24.68	10.62
Calcite*5.	14	4.49	5.45
POLISH*6	2	0.64	0.07
Quartz*7	43	13.78	10.26
Tourmaline	17	5.45	13.70
Plagioclase*29	109	34.94	26.92
Hornblende*24	16	5.13	13.43
Microcline*10	1	0.32	1.55
Ankerite*25	2	0.64	1.44
Epidote*24	1	0.32	0.14
Siderite*12	1	0.32	1.98
Almandine	2	0.64	0.25
Andradite*24*25	5	1.60	5.30
Sulphur*18	1	0.32	0.04
Pyrite*20	3	0.96	0.40
SUM	312	100	100.00

TABLE 52. Interpretative analysis summary of mineral classes and weight percentages for: -48m to +200m; 2.60 Sink fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	14	3.54	0.55
Kaolinite#8	2	0.51	0.03
Dolomite	18	4.55	11.56
Szomolnokite#2	3	0.76	0.88
Illite#4	27	6.82	1.85
Calcite#5.	132	33.33	37.66
POLISH#6	4	1.01	0.14
Quartz#7	62	15.66	24.76
Chlorite#9	2	0.51	0.09
Tourmaline	2	0.51	0.13
Plagioclase#29	49	12.37	5.07
Hornblende#24	16	4.04	0.92
Microcline#10	1	0.25	0.04
Diopside#22	1	0.25	0.02
Ankerite#25	4	1.01	0.29
Epidote#24	5	1.26	0.52
Siderite#12	2	0.51	0.07
Apatite#14	2	0.51	0.48
Augite#22	2	0.51	0.04
Almandine	3	0.76	1.05
Andradite#24#25	11	2.78	6.09
Rutile#13	1	0.25	0.03
Sulphur#18	11	2.78	0.23
Witherite	1	0.25	0.09
Pyrite#20	21	5.30	7.41
SUM	396	100	100.00

TABLE 53. Interpretative analysis summary of mineral classes and weight percentages for: -200m to +400m; 2.20 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	1	0.76	0.05
Kaolinite#8	5	3.79	0.62
Dolomite	1	0.76	0.07
Illite#4	32	24.24	12.40
Calcite#5.	3	2.27	1.08
POLISH#6	3	2.27	0.15
Quartz#7	16	12.12	16.32
Chlorite#9	1	0.76	0.05
Tourmaline	1	0.76	0.09
Plagioclase#29	42	31.82	40.92
Hornblende#24	8	6.06	11.69
Diopside#22	1	0.76	0.09
Ankerite#25	1	0.76	1.89
Epidote#24	2	1.52	0.98
Siderite#12	1	0.76	5.01
Almandine	4	3.03	1.05
Andradite#24#25	4	3.03	4.08
Sulphur#18	1	0.76	0.04
Pyrite#20	5	3.79	3.43
SUM	132	100	100.00

TABLE 54. Interpretative analysis summary of mineral classes and weight percentages for: -200m to +400m; 2.40 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	3	1.06	0.12
Kaolinite#8	5	1.76	0.36
Dolomite	1	0.35	0.78
Illite#4	69	24.30	34.60
Calcite#5.	12	4.23	3.05
POLISH#6	3	1.06	0.14
Quartz#7	47	16.55	15.16
Chlorite#9	1	0.35	0.01
Tourmaline	10	3.52	2.93
Plagioclase#29	104	36.62	32.90
Hornblende#24	13	4.58	2.40
Microcline#10	1	0.35	0.08
Ankerite#25	2	0.70	0.90
Rhodochrosite	1	0.35	0.16
Apatite#14	1	0.35	1.06
Almandine	4	1.41	1.84
Andradite#24#25	4	1.41	2.03
Rutile#13	1	0.35	0.77
Sulphur#18	1	0.35	0.07
Pyrite#20	1	0.35	0.63
SUM	284	100	100.00

TABLE 55. Interpretative analysis summary of mineral classes and weight percentages for: -200m to +400m; 2.60 Float fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	1	0.43	0.03
Kaolinite#8	6	2.58	1.87
Dolomite	4	1.72	3.67
Szomolnokite#2	1	0.43	0.31
Jarosite	1	0.43	1.16
Staurolite	1	0.43	0.31
Illite#4	39	16.74	8.73
Calcite#5.	31	13.30	18.84
POLISH#6	5	2.15	0.33
Quartz#7	66	28.33	41.43
Chlorite#9	1	0.43	0.02
Tourmaline	8	3.43	0.44
Plagioclase#29	50	21.46	17.03
Biotite#27	2	0.86	0.05
Hornblende#24	9	3.86	1.56
Ankerite#25	2	0.86	0.80
Epidote#24	3	1.29	3.26
Siderite#12	1	0.43	0.06
Almandine	1	0.43	0.07
Andradite#24#25	1	0.43	0.03
SUM	233	100	100.00

TABLE 56. Interpretative analysis summary of mineral classes and weight percentages for -200m to +400m; 2.60 Sink fraction.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.52	0.07
Kaolinite*8	2	0.52	0.02
Dolomite	17	4.46	4.71
Szomolnokite*2	9	2.36	3.66
Jarosite	1	0.26	0.17
Illite*4	11	2.89	0.95
Calcite*5.	115	30.18	30.11
Quartz*7	86	22.57	20.96
Tourmaline	2	0.52	0.01
Plagioclase*29	30	7.87	2.83
Biotite*27	1	0.26	0.01
Hornblende*24	9	2.36	1.75
Goethite*11	2	0.52	1.53
Ankerite*25	3	0.79	0.16
Epidote*24	5	1.31	1.04
Siderite*12	4	1.05	1.92
Apatite*14	2	0.52	0.22
Sphene	1	0.26	0.10
Andradite*24*25	1	0.26	0.41
Rutile*13	2	0.52	1.13
Sulphur*18	24	6.30	3.64
Sylvite	1	0.26	0.01
Pyrite*20	51	13.39	24.62
SUM	381	100	100.00

TABLE 57a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #1 Concentrate

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.74	0.12
Kaolinite*8	1	0.25	0.02
Montmorillonite	1	0.25	0.06
Dolomite	12	2.96	0.58
Illite*4	88	21.73	14.59
Calcite*5.	21	5.19	9.16
POLISH*6	1	0.25	0.06
Quartz*7	42	10.37	7.33
Chlorite*9	5	1.23	0.16
Tourmaline	7	1.73	0.75
Plagioclase*29	153	37.78	45.38
Biotite*27	2	0.49	0.05
Hornblende*24	22	5.43	1.71
Ankerite*25	8	1.98	0.90
Epidote*24	7	1.73	4.69
Apatite*14	1	0.25	0.37
Almandine	3	0.74	1.20
Andradite*24*25	12	2.96	10.41
Sulphur*18	8	1.98	0.52
Pyrite*20	8	1.98	1.95
SUM	405	100	100.00

TABLE 57b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #1 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.80	0.24
Dolomite	16	4.24	1.79
Szomolnokite*2	1	0.27	0.03
Illite*4	49	13.00	9.14
Calcite*5.	50	13.26	18.83
Quartz*7	64	16.98	13.51
Tourmaline	2	0.53	0.50
Plagioclase*29	140	37.14	31.60
Hornblende*24	6	1.59	2.56
Ankerite*25	8	2.12	5.89
Epidote*24	2	0.53	0.20
Apatite*14	2	0.53	0.87
Andradite*24*25	21	5.57	13.13
Sulphur*18	2	0.53	0.09
Pyrite*20	11	2.92	1.62
SUM	377	100	100.00

TABLE 58a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #2 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.89	0.91
Kaolinite*8	1	0.32	0.02
Montmorillonite	1	0.32	0.04
Dolomite	8	2.52	6.02
Szomolnokite*2	1	0.32	4.21
Illite*4	51	16.09	9.12
Calcite*5.	22	6.94	4.47
POLISH*6	1	0.32	0.03
Quartz*7	43	13.56	15.32
Tourmaline	3	0.95	0.18
Plagioclase*29	131	41.32	25.47
Hornblende*24	9	2.84	7.18
Microcline*10	1	0.32	0.02
Ankerite*25	6	1.89	9.42
Epidote*24	4	1.26	0.52
Apatite*14	3	0.95	0.25
Augite*22	2	0.63	0.13
Almandine	3	0.95	1.58
Andradite*24*25	14	4.42	1.95
Sulphur*18	2	0.63	0.03
Pyrite*20	5	1.58	13.16
SUM	317	100	100.00

TABLE 58b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #2 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	7	1.40	0.26
Kaolinite*8	3	0.60	2.30
Montmorillonite	2	0.40	0.06
Dolomite	25	5.01	4.20
Szomolnokite*2	4	0.80	0.46
Illite*4	77	15.43	17.93
Calcite*5.	54	10.82	11.16
Quartz*7	61	12.22	11.62
Tourmaline	1	0.20	0.01
Plagioclase*29	166	33.27	21.84
Hornblende*24	34	6.81	3.86
Microcline*10	1	0.20	0.37
Goethite*11	1	0.20	0.23
Ankerite*25	11	2.20	2.07
Epidote*24	7	1.40	0.56
Siderite*12	1	0.20	0.08
Almandine	3	0.60	0.16
Andradite*24*25	23	4.61	6.14
Sulphur*18	3	0.60	0.37
Pyrite*20	15	3.01	16.31
SUM	499	100	100.00

TABLE 59a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #3 Concentrate

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	5	1.56	1.46
Kaolinite*8	4	1.25	0.35
Montmorillonite	1	0.31	0.05
Dolomite	6	1.87	4.82
Szomolnokite*2	1	0.31	0.04
Illite*4	54	16.82	11.38
Calcite*5.	25	7.79	7.67
Quartz*7	48	14.95	17.73
Tourmaline	6	1.87	0.38
Plagioclase*29	121	37.69	30.89
Biotite*27	1	0.31	0.04
Hornblende*24	16	4.98	13.88
Ankerite*25	3	0.93	0.43
Epidote*24	3	0.93	0.22
Siderite*12	2	0.62	0.47
Apatite*14	3	0.93	0.31
Almandine	3	0.93	0.82
Andradite*24*25	9	2.80	1.21
Sulphur*18	1	0.31	0.04
Pyrite*20	8	2.49	7.78
Pentlandite*19	1	0.31	0.03
SUM	321	100	100.00

TABLE 59b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #3 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	14	2.64	0.35
Kaolinite*8	2	0.38	0.16
Dolomite	36	6.79	5.63
Szomolnokite*2	1	0.19	0.92
Illite*4	80	15.09	26.65
Calcite*5.	64	12.08	11.79
POLISH*6	1	0.19	0.01
Quartz*7	55	10.38	5.90
Chlorite*9	1	0.19	0.01
Tourmaline	8	1.51	0.12
Plagioclase*29	179	33.77	37.15
Biotite*27	2	0.38	0.21
Hornblende*24	22	4.15	3.76
Ankerite*25	6	1.13	0.36
Epidote*24	6	1.13	0.21
Siderite*12	1	0.19	0.04
Apatite*14	1	0.19	0.01
Augite*22	1	0.19	0.05
Almandine	1	0.19	0.01
Andradite*24*25	37	6.98	6.12
Sulphur*18	2	0.38	0.06
Pyrite*20	10	1.89	0.48
SUM	530	100	100.00

TABLE 60a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #4 Concentrate

MINERAL CLASS	P.R.C.	NORMALIZED MINERALS	NORMALIZED ***
	#	# %	WT %
Gypsum*1	8	1.84	1.08
Kaolinite*8	2	0.46	0.17
Dolomite	9	2.07	1.42
Szomolnokite*2	2	0.46	1.29
Illite*4	66	15.17	12.54
Calcite*5.	49	11.26	11.75
Quartz*7	80	18.39	19.87
Chlorite*9	1	0.23	0.03
Tourmaline	12	2.76	1.99
Plagioclase*29	149	34.25	36.24
Biotite*27	1	0.23	0.07
Hornblende*24	16	3.68	4.34
Microcline*10	1	0.23	0.62
Ankerite*25	6	1.38	0.79
Epidote*24	1	0.23	2.92
Apatite*14	6	1.38	1.03
Almandine	3	0.69	0.76
Andradite*24*25	11	2.53	1.12
Rutile*13	1	0.23	0.07
Sulphur*18	4	0.92	0.21
Pyrite*20	7	1.61	1.69
SUM	435	100	100.00

TABLE 60b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #4 Tails.

MINERAL CLASS	P.R.C.	NORMALIZED MINERALS	NORMALIZED ***
	#	# %	WT %
Gypsum*1	5	1.19	0.53
Kaolinite*8	7	1.67	2.51
Montmorillonite	1	0.24	0.05
Dolomite	18	4.30	2.81
Szomolnokite*2	1	0.24	2.22
Jarosite	1	0.24	0.05
Illite*4	67	15.99	14.28
Calcite*5.	24	5.73	10.61
POLISH*6	2	0.48	0.06
Quartz*7	64	15.27	19.85
Chlorite*9	2	0.48	0.07
Tourmaline	5	1.19	1.39
Plagioclase*29	162	38.66	32.77
Biotite*27	3	0.72	0.17
Hornblende*24	13	3.10	1.36
Diopside*22	1	0.24	0.07
Ankerite*25	9	2.15	6.34
Epidote*24	6	1.43	0.79
Siderite*12	1	0.24	0.07
Apatite*14	2	0.48	0.51
Almandine	2	0.48	0.21
Andradite*24*25	13	3.10	1.82
Sulphur*18	2	0.48	0.11
Pyrite*20	8	1.91	1.36
SUM	419	100	100.00

TABLE 61a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #5 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.55	0.36
Kaolinite*8	4	1.09	2.26
Dolomite	7	1.91	0.27
Szomolnokite*2	1	0.27	0.02
Illite*4	57	15.57	8.99
Calcite*5.	24	6.56	11.41
POLISH*6	2	0.55	0.07
Quartz*7	58	15.85	17.24
Tourmaline	2	0.55	0.17
Plagioclase*29	143	39.07	30.59
Hornblende*24	24	6.56	10.23
Ankerite*25	7	1.91	2.18
Epidote*24	5	1.37	11.73
Apatite*14	1	0.27	0.05
Almandine	5	1.37	0.77
Andradite*24*25	14	3.83	2.68
Sulphur*18	5	1.37	0.48
Pyrite*20	5	1.37	0.49
SUM	366	100	100.00

TABLE 61b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #5 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	7	1.12	0.08
Kaolinite*8	3	0.48	0.36
Dolomite	38	6.08	8.07
Illite*4	89	14.24	10.48
Calcite*5.	80	12.80	16.98
Quartz*7	65	10.40	4.77
Chlorite*9	1	0.16	0.18
Tourmaline	8	1.28	0.69
Plagioclase*29	210	33.60	34.23
Biotite*27	4	0.64	0.07
Hornblende*24	31	4.96	3.95
Microcline*10	1	0.16	0.05
Goethite*11	1	0.16	0.09
Diopside*22	1	0.16	0.02
Ankerite*25	13	2.08	3.44
Epidote*24	7	1.12	1.22
Apatite*14	4	0.64	1.00
Almandine	2	0.32	0.32
Andradite*24*25	42	6.72	5.39
Sulphur*18	7	1.12	0.34
Pyrite*20	11	1.76	8.27
SUM	625	100	100.00

TABLE 62a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #6 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.77	1.73
Kaolinite*8	5	1.28	0.88
Montmorillonite	1	0.26	0.01
Dolomite	9	2.30	2.36
Szomolnokite*2	2	0.51	0.05
Illite*4	78	19.90	14.36
Calcite*5.	20	5.10	3.39
POLISH#6	1	0.26	0.03
Quartz*7	55	14.03	21.91
Chlorite*9	1	0.26	0.05
Tourmaline	5	1.28	1.92
Plagioclase*29	153	39.03	43.75
Hornblende*24	25	6.38	2.06
Ankerite*25	3	0.77	0.58
Epidote*24	3	0.77	0.13
Siderite*12	3	0.77	0.12
Apatite*14	1	0.26	0.02
Almandine	3	0.77	0.84
Andradite*24*25	14	3.57	3.98
Sulphur*18	1	0.26	0.02
Pyrite*20	5	1.28	1.59
Arsenopyrite	1	0.26	0.22
SUM	392	100	100.00

TABLE 62b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table #6 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	5	1.36	0.30
Kaolinite*8	4	1.08	0.42
Dolomite	22	5.96	1.32
Illite*4	63	17.07	5.58
Calcite*5.	31	8.40	21.28
POLISH#6	1	0.27	0.03
Quartz*7	33	8.94	20.15
Tourmaline	6	1.63	0.74
Plagioclase*29	131	35.50	22.17
Biotite*27	1	0.27	0.13
Hornblende*24	24	6.50	8.50
Microcline*10	2	0.54	0.38
Ankerite*25	6	1.63	6.19
Epidote*24	5	1.36	0.96
Siderite*12	1	0.27	0.73
Apatite*14	3	0.81	3.26
Almandine	3	0.81	0.19
Andradite*24*25	20	5.42	7.00
Sulphur*18	4	1.08	0.07
Pyrite*20	4	1.08	0.62
SUM	369	100	100.00

TABLE 63a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #7 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Kaolinite*8	10	3.58	0.64
Montmorillonite	1	0.36	0.03
Dolomite	3	1.08	0.61
Illite*4	54	19.35	17.73
Calcite*5.	20	7.17	10.54
Quartz*7	41	14.70	19.53
Tourmaline	7	2.51	0.49
Plagioclase*29	104	37.28	26.56
Hornblende*24	13	4.66	18.53
Ankerite*25	4	1.43	0.50
Epidote*24	2	0.72	0.53
Siderite*12	1	0.36	0.06
Apatite*14	1	0.36	0.03
Almandine	4	1.43	1.34
Andradite*24*25	7	2.51	2.63
Sulphur*18	1	0.36	0.03
Pyrite*20	6	2.15	0.24
SUM	279	100	100.00

TABLE 63b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #7 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	6	1.44	0.49
Kaolinite*8	2	0.48	0.15
Dolomite	29	6.95	13.96
Szomolnokite*2	2	0.48	0.38
Illite*4	68	16.31	8.96
Calcite*5.	50	11.99	27.85
POLISH#6	2	0.48	0.08
Quartz*7	56	13.43	11.14
Tourmaline	2	0.48	0.11
Plagioclase*29	133	31.89	23.61
Biotite*27	1	0.24	0.04
Hornblende*24	13	3.12	1.48
Diopside*22	2	0.48	0.10
Ankerite*25	3	0.72	1.05
Epidote*24	6	1.44	5.33
Siderite*12	1	0.24	0.11
Apatite*14	1	0.24	0.19
Augite*22	1	0.24	0.06
Sphene	1	0.24	0.06
Almandine	2	0.48	0.10
Andradite*24*25	23	5.52	3.10
Sulphur*18	4	0.96	0.11
Pyrite*20	9	2.16	1.56
SUM	417	100	100.00

TABLE 64a. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #8 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.63	2.75
Kaolinite*8	3	0.94	0.33
Montmorillonite	1	0.31	0.14
Dolomite	7	2.20	0.21
Staurolite	1	0.31	0.02
Illite*4	76	23.90	17.46
Calcite*5.	15	4.72	9.02
Quartz*7	38	11.95	9.16
Chlorite*9	1	0.31	0.01
Tourmaline	6	1.89	2.24
Plagioclase*29	110	34.59	21.58
Hornblende*24	23	7.23	10.68
Ankerite*25	4	1.26	0.49
Epidote*24	5	1.57	20.72
Siderite*12	2	0.63	1.71
Apatite*14	2	0.63	0.93
Augite*22	1	0.31	0.22
Almandine	2	0.63	0.43
Andradite*24*25	14	4.40	1.56
Sulphur*18	2	0.63	0.05
Pyrite*20	3	0.94	0.31
SUM	318	100	100.00

TABLE 64b. Interpretative analysis summary of mineral classes and weight percentages for: Concentrating Table Sample #8 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	11	2.66	0.63
Kaolinite*8	2	0.48	0.07
Montmorillonite	1	0.24	0.01
Talc*3	1	0.24	0.06
Dolomite	12	2.91	3.38
Jarosite	2	0.48	0.13
Illite*4	58	14.04	19.69
Calcite*5.	46	11.14	19.38
Quartz*7	46	11.14	15.26
Chlorite*9	2	0.48	0.10
Tourmaline	3	0.73	0.11
Plagioclase*29	145	35.11	27.21
Hornblende*24	32	7.75	3.56
Ankerite*25	9	2.18	0.92
Epidote*24	8	1.94	0.74
Siderite*12	1	0.24	0.28
Apatite*14	1	0.24	0.05
Augite*22	1	0.24	0.21
Almandine	7	1.69	2.31
Andradite*24*25	14	3.39	5.02
Sulphur*18	6	1.45	0.47
Pyrite*20	5	1.21	0.43
SUM	413	100	100.00

TABLE 65a. Interpretative analysis summary of mineral classes and weight percentages for Concentrating Table Sample #9, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.69	0.29
Kaolinite*8	7	1.61	5.34
Montmorillonite	1	0.23	0.01
Dolomite	9	2.06	1.41
Szomolnokite*2	2	0.46	1.50
Illite*4	91	20.87	17.32
Calcite*5.	19	4.36	2.73
POLISH*6	1	0.23	0.04
Quartz*7	64	14.68	11.22
Tourmaline	9	2.06	1.43
Plagioclase*29	159	36.47	38.72
Hornblende*24	29	6.65	5.57
Ankerite*25	3	0.69	0.31
Epidote*24	3	0.69	0.19
Apatite*14	3	0.69	0.59
Almandine	3	0.69	1.55
Andradite*24*25	15	3.44	7.24
Sulphur*18	3	0.69	0.16
Pyrite*20	12	2.75	4.38
SUM	436	100	100.00

TABLE 65b. Interpretative analysis summary of mineral classes and weight percentages for Concentrating Table Sample #9 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	9	2.01	0.91
Kaolinite*8	4	0.89	0.54
Montmorillonite	1	0.22	0.02
Dolomite	32	7.16	8.78
Jarosite	1	0.22	0.09
Illite*4	49	10.96	7.04
Calcite*5.	50	11.19	17.72
Quartz*7	65	14.54	11.94
Tourmaline	2	0.45	0.12
Plagioclase*29	162	36.24	26.15
Biotite*27	2	0.45	0.09
Hornblende*24	17	3.80	5.85
Ankerite*25	8	1.79	1.14
Epidote*24	8	1.79	1.28
Siderite*12	1	0.22	0.10
Apatite*14	1	0.22	0.04
Augite*22	1	0.22	0.11
Almandine	2	0.45	0.07
Andradite*24*25	18	4.03	6.70
Sulphur*18	6	1.34	0.61
Pyrite*20	8	1.79	10.71
SUM	447	100	100.00

TABLE 66a. Interpretative analysis summary of mineral classes and weight percentages for Concentrating Table Sample #10 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	4	0.97	0.39
Kaolinite*8	3	0.73	0.80
Dolomite	10	2.42	1.40
Jarosite	1	0.24	0.29
Illite*4	86	20.82	19.65
Calcite*5.	30	7.26	8.73
Quartz*7	58	14.04	16.18
Tourmaline	11	2.66	0.94
Plagioclase*29	149	36.08	31.94
Biotite*27	1	0.24	0.03
Hornblende*24	13	3.15	1.65
Ankerite*25	4	0.97	1.15
Epidote*24	10	2.42	3.91
Siderite*12	2	0.48	0.27
Apatite*14	2	0.48	6.45
Augite*22	2	0.48	0.30
Almandine	3	0.73	0.83
Andradite*24*25	13	3.15	2.17
Rutile*13	1	0.24	0.17
Sulphur*18	3	0.73	0.59
Pyrite*20	7	1.69	2.19
SUM	413	100	100.00

TABLE 66b. Interpretative analysis summary of mineral classes and weight percentages for Concentrating Table Sample #10 Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.27	4.68
Kaolinite*8	1	0.21	0.02
Montmorillonite	1	0.21	0.03
Talc*3	1	0.21	0.01
Dolomite	27	5.72	6.67
Szomolnokite*2	2	0.42	0.61
Illite*4	60	12.71	15.25
Calcite*5.	57	12.08	14.96
Quartz*7	43	9.11	7.44
Chlorite*9	1	0.21	0.04
Tourmaline	7	1.48	0.26
Plagioclase*29	164	34.75	23.31
Biotite*27	1	0.21	0.13
Hornblende*24	28	5.93	1.73
Microcline*10	3	0.64	0.10
Ankerite*25	10	2.12	1.33
Epidote*24	4	0.85	5.28
Siderite*12	2	0.42	0.19
Apatite*14	2	0.42	0.12
Almandine	3	0.64	0.57
Andradite*24*25	39	8.26	15.22
Sulphur*18	5	1.06	1.10
Pyrite*20	5	1.06	0.94
SUM	472	100	100.00

TABLE 67a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test #1 Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.69	0.08
Kaolinite#8	4	1.39	1.18
Dolomite	4	1.39	0.94
Jarosite	1	0.35	0.02
Illite#4	42	14.58	21.44
Calcite#5.	30	10.42	13.97
Quartz#7	52	18.06	11.84
Tourmaline	4	1.39	0.79
Plagioclase#29	93	32.29	35.16
Biotite#27	1	0.35	0.06
Hornblende#24	15	5.21	1.49
Microcline#10	1	0.35	0.08
Diopside#22	2	0.69	0.09
Ankerite#25	4	1.39	0.54
Epidote#24	2	0.69	0.30
Apatite#14	4	1.39	7.37
Augite#22	1	0.35	0.28
Almandine	2	0.69	0.32
Andradite#24#25	6	2.08	0.76
Sulphur#18	4	1.39	0.12
Pyrite#20	13	4.51	3.09
Linnaeite	1	0.35	0.08
SUM	288	100	100.00

TABLE 67b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #1, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	7	1.42	0.39
Kaolinite#8	8	1.62	2.03
Montmorillonite	1	0.20	0.02
Dolomite	24	4.87	4.62
Szomolnokite#2	1	0.20	0.60
Illite#4	73	14.81	8.75
Calcite#5.	30	6.09	9.07
Quartz#7	83	16.84	11.01
Tourmaline	4	0.81	0.55
Plagioclase#29	164	33.27	39.79
Biotite#27	2	0.41	0.09
Hornblende#24	23	4.67	4.28
Microcline#10	2	0.41	0.20
Ankerite#25	7	1.42	0.33
Epidote#24	6	1.22	1.05
Apatite#14	8	1.62	5.68
Andradite#24#25	21	4.26	2.93
Sulphur#18	7	1.42	0.73
Pyrite#20	21	4.26	7.75
Linnaeite	1	0.20	0.11
SUM	493	100	100.00

TABLE 68a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #2, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.38	1.23
Kaolinite*8	6	1.38	0.65
Dolomite	13	2.99	2.18
Szomolnokite*2	1	0.23	0.37
Illite*4	64	14.71	15.05
Calcite*5.	39	8.97	9.73
POLISH*6	1	0.23	0.08
Quartz*7	75	17.24	19.11
Tourmaline	8	1.84	1.64
Plagioclase*29	158	36.32	28.34
Biotite*27	3	0.69	0.16
Hornblende*24	17	3.91	2.74
Ankerite*25	1	0.23	0.06
Epidote*24	8	1.84	2.52
Siderite*12	1	0.23	0.05
Apatite*14	2	0.46	0.73
Almandine	3	0.69	0.44
Andradite*24*25	13	2.99	3.07
Rutile*13	1	0.23	1.77
Sulphur*18	4	0.92	0.33
Pyrite*20	11	2.53	9.75
SUM	435	100	100.00

TABLE 68b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #2, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	2.09	0.50
Kaolinite*8	3	1.05	0.49
Dolomite	7	2.44	0.50
Szomolnokite*2	1	0.35	0.01
Illite*4	40	13.94	28.08
Calcite*5.	17	5.92	10.21
POLISH*6	4	1.39	0.07
Quartz*7	43	14.98	11.24
Tourmaline	6	2.09	0.97
Plagioclase*29	108	37.63	26.74
Biotite*27	1	0.35	0.01
Hornblende*24	12	4.18	0.61
Diopside*22	2	0.70	0.03
Ankerite*25	10	3.48	6.62
Epidote*24	3	1.05	0.16
Augite*22	1	0.35	9.37
Almandine	1	0.35	0.06
Andradite*24*25	10	3.48	1.11
Halite	1	0.35	0.01
Sulphur*18	6	2.09	0.11
Pyrite*20	5	1.74	3.11
SUM	287	100	100.00

TABLE 69a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #3, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	9	2.41	0.80
Kaolinite*8	6	1.60	3.08
Dolomite	7	1.87	0.90
Szomolnokite*2	4	1.07	0.27
Illite*4	62	16.58	16.57
Calcite*5.	30	8.02	19.99
POLISH*6	1	0.27	0.03
Quartz*7	51	13.64	14.74
Tourmaline	6	1.60	2.68
Plagioclase*29	125	33.42	22.85
Hornblende*24	24	6.42	3.07
Ankerite*25	11	2.94	2.42
Epidote*24	4	1.07	0.55
Siderite*12	1	0.27	0.06
Apatite*14	1	0.27	0.03
Augite*22	1	0.27	0.03
Almandine	2	0.53	0.13
Andradite*24*25	16	4.28	7.89
Sulphur*18	2	0.53	0.17
Pyrite*20	11	2.94	3.73
SUM	374	100	100.00

TABLE 69b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #3, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.62	0.17
Kaolinite*8	3	0.93	1.59
Dolomite	9	2.79	3.32
Illite*4	53	16.41	17.77
Calcite*5.	20	6.19	5.34
Quartz*7	43	13.31	15.34
Chlorite*9	2	0.62	0.04
Tourmaline	8	2.48	0.91
Plagioclase*29	120	37.15	30.60
Biotite*27	1	0.31	0.06
Hornblende*24	25	7.74	11.89
Ankerite*25	5	1.55	4.09
Epidote*24	2	0.62	0.23
Apatite*14	1	0.31	0.10
Almandine	1	0.31	0.16
Andradite*24*25	18	5.57	7.58
Sulphur*18	3	0.93	0.15
Pyrite*20	6	1.86	0.58
Linnaeite	1	0.31	0.08
SUM	323	100	100.00

TABLE 70a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #4, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	1	0.30	0.03
Kaolinite*8	2	0.59	0.12
Dolomite	7	2.08	4.72
Szomolnokite*2	1	0.30	0.14
Staurolite	1	0.30	0.24
Illite*4	59	17.51	14.21
Calcite*5.	27	8.01	8.93
Quartz*7	51	15.13	10.40
Tourmaline	6	1.78	0.50
Plagioclase*29	135	40.06	32.56
Hornblende*24	15	4.45	5.46
Ankerite*25	2	0.59	0.32
Epidote*24	5	1.48	0.84
Almandine	2	0.59	8.90
Andradite*24*25	14	4.15	11.84
Sulphur*18	2	0.59	0.04
Pyrite*20	7	2.08	0.73
SUM	337	100	100.00

TABLE 70b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #4, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.78	0.20
Kaolinite*8	5	1.48	0.51
Dolomite	10	2.97	2.17
Staurolite	1	0.30	0.04
Illite*4	66	19.58	16.18
Calcite*5.	18	5.34	3.99
POLISH*6	1	0.30	0.02
Quartz*7	43	12.76	9.62
Chlorite*9	1	0.30	0.06
Tourmaline	3	0.89	0.08
Plagioclase*29	137	40.65	57.04
Hornblende*24	22	6.53	3.27
Microcline*10	1	0.30	0.12
Ankerite*25	6	1.78	4.40
Epidote*24	2	0.59	0.05
Apatite*14	1	0.30	0.02
Almandine	1	0.30	0.41
Andradite*24*25	11	3.26	1.45
Pyrite*20	2	0.59	0.34
SUM	337	100	100.00

TABLE 71a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #5, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	5	1.29	1.79
Kaolinite*8	8	2.06	1.61
Dolomite	9	2.32	1.70
Szomolnokite*2	1	0.26	0.27
Illite*4	60	15.46	11.79
Calcite*5.	24	6.19	7.43
POLISH*6	2	0.52	0.07
Quartz*7	46	11.86	10.95
Chlorite*9	1	0.26	0.12
Tourmaline	7	1.80	1.54
Plagioclase*29	160	41.24	43.05
Biotite*27	2	0.52	0.47
Hornblende*24	22	5.67	9.73
Microcline*10	1	0.26	0.08
Ankerite*25	2	0.52	0.35
Epidote*24	6	1.55	0.40
Siderite*12	2	0.52	0.12
Apatite*14	2	0.52	0.25
Almandine	3	0.77	1.06
Andradite*24*25	18	4.64	4.36
Rutile*13	1	0.26	0.05
Sulphur*18	2	0.52	0.11
Pyrite*20	4	1.03	2.71
SUM	388	100	100.00

TABLE 71b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #5, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	5	1.27	0.41
Kaolinite*8	5	1.27	0.21
Dolomite	14	3.55	1.27
Illite*4	83	21.07	16.52
Calcite*5.	29	7.36	10.36
POLISH*6	1	0.25	0.23
Quartz*7	51	12.94	7.93
Chlorite*9	3	0.76	0.10
Tourmaline	6	1.52	1.28
Plagioclase*29	145	36.80	27.75
Biotite*27	1	0.25	0.01
Hornblende*24	16	4.06	1.58
Ankerite*25	6	1.52	0.48
Epidote*24	5	1.27	0.17
Siderite*12	1	0.25	0.39
Apatite*14	2	0.51	0.82
Augite*22	1	0.25	0.01
Andradite*24*25	13	3.30	2.60
Rutile*13	2	0.51	0.12
Sulphur*18	1	0.25	0.05
Pyrite*20	4	1.02	27.71
SUM	394	100	100.00

TABLE 72a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #6, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.53	0.25
Kaolinite*8	2	0.51	0.16
Montmorillonite	2	0.51	0.22
Dolomite	5	1.28	4.92
Szomolnokite*2	2	0.51	0.44
Illite*4	71	18.11	18.83
Calcite*5.	22	5.61	5.99
POLISH*6	1	0.26	0.05
Quartz*7	43	10.97	8.24
Chlorite*9	4	1.02	4.87
Tourmaline	8	2.04	2.78
Plagioclase*29	150	38.27	38.37
Hornblende*24	27	6.89	4.40
Ankerite*25	7	1.79	1.44
Epidote*24	8	2.04	0.95
Apatite*14	3	0.77	1.02
Augite*22	1	0.26	0.22
Almandine	5	1.28	0.98
Andradite*24*25	21	5.36	5.18
Rutile*13	1	0.26	0.05
Sulphur*18	3	0.77	0.63
SUM	392	100	100.00

TABLE 72b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #6, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	4	1.66	0.62
Kaolinite*8	4	1.66	2.07
Dolomite	8	3.32	7.14
Illite*4	46	19.09	29.57
Calcite*5.	14	5.81	4.19
Quartz*7	23	9.54	20.75
Tourmaline	3	1.24	4.11
Plagioclase*29	92	38.17	18.64
Biotite*27	1	0.41	0.09
Hornblende*24	11	4.56	1.13
Ankerite*25	5	2.07	0.48
Epidote*24	4	1.66	3.87
Apatite*14	2	0.83	0.46
Augite*22	1	0.41	0.03
Almandine	3	1.24	0.97
Andradit:*24*25	12	4.98	4.21
Pyrite*20	8	3.32	1.67
SUM	241	100	100.00

TABLE 73a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #7, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	7	1.65	0.75
Kaolinite#8	4	0.94	0.22
Montmorillonite	1	0.24	0.03
Dolomite	10	2.35	1.75
Szomolnokite#2	2	0.47	0.35
Jarosite	1	0.24	0.23
Illite#4	85	20.00	10.77
Calcite#5.	26	6.12	9.59
Quartz#7	57	13.41	11.85
Chlorite#9	1	0.24	0.02
Tourmaline	7	1.65	1.13
Plagioclase#29	169	39.76	52.52
Biotite#27	1	0.24	0.02
Hornblende#24	20	4.71	3.16
Ankerite#25	5	1.18	1.30
Epidote#24	9	2.12	2.47
Siderite#12	1	0.24	0.05
Apatite#14	2	0.47	1.08
Almandine	1	0.24	0.23
Andradite#24#25	11	2.59	1.46
Sulphur#18	2	0.47	0.40
Pyrite#20	3	0.71	0.62
SUM	425	100	100.00

TABLE 73b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #7, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.53	0.12
Kaolinite#8	2	0.53	0.13
Dolomite	18	4.77	1.12
Illite#4	67	17.77	38.65
Calcite#5.	29	7.69	9.20
POLISH#6	2	0.53	0.09
Quartz#7	56	14.85	7.15
Chlorite#9	1	0.27	0.63
Tourmaline	6	1.59	0.27
Plagioclase#29	131	34.75	32.25
Biotite#27	1	0.27	0.03
Hornblende#24	21	5.57	2.43
Microcline#10	1	0.27	0.03
Diopside#22	2	0.53	0.11
Ankerite#25	10	2.65	4.29
Epidote#24	8	2.12	1.74
Apatite#14	2	0.53	0.22
Andradite#24#25	10	2.65	0.93
Sulphur#18	1	0.27	0.02
Sylvite	1	0.27	0.12
Pyrite#20	6	1.59	0.49
SUM	377	100	100.00

TABLE 74a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #8, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	2.73	1.37
Kaolinite*8	2	0.91	0.85
Dolomite	2	0.91	0.32
Szomolnokite*2	2	0.91	0.58
Illite*4	44	20.00	12.86
Calcite*5.	13	5.91	13.22
Quartz*7	30	13.64	16.05
Chlorite*9	1	0.45	0.03
Tourmaline	5	2.27	0.50
Plagioclase*29	78	35.45	28.91
Hornblende*24	14	6.36	2.43
Diopside*22	1	0.45	0.22
Ankerite*25	5	2.27	1.95
Epidote*24	1	0.45	0.16
Sphene	1	0.45	0.10
Almandine	3	1.36	5.97
Andradite*24*25	7	3.18	4.42
Rutile*13	1	0.45	0.75
Pyrite*20	4	1.82	9.31
SUM	220	100	100.00

TABLE 74b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #8, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	5	1.64	3.64
Kaolinite*8	5	1.64	0.44
Dolomite	14	4.59	2.10
Jarosite	1	0.33	5.98
Staurolite	1	0.33	0.03
Illite*4	48	15.74	30.43
Calcite*5.	23	7.54	9.35
Quartz*7	55	18.03	10.08
Chlorite*9	2	0.66	0.08
Tourmaline	5	1.64	0.23
Plagioclase*29	110	36.07	25.54
Biotite*27	1	0.33	0.02
Hornblende*24	12	3.93	3.48
Ankerite*25	2	0.66	0.06
Epidote*24	2	0.66	0.06
Apatite*14	2	0.66	0.05
Almandine	1	0.33	0.03
Andradite*24*25	12	3.93	7.60
Rutile*13	1	0.33	0.66
Sulphur*18	2	0.66	0.08
Pyrite*20	1	0.33	0.04
SUM	305	100	100.00

TABLE 75a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #9, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	4	1.44	0.13
Kaolinite*8	1	0.36	0.04
Montmorillonite	1	0.36	0.03
Dolomite	7	2.52	5.43
Illite*4	68	24.46	19.20
Calcite*5.	19	6.83	12.17
POLISH*6	1	0.36	0.02
Quartz*7	30	10.79	16.21
Tourmaline	9	3.24	4.66
Plagioclase*29	94	33.81	33.38
Hornblende*24	15	5.40	1.63
Ankerite*25	6	2.16	2.19
Epidote*24	5	1.80	0.18
Apatite*14	1	0.36	0.58
Sphene	1	0.36	0.06
Andradite*24*25	9	3.24	1.46
Sulphur*18	2	0.72	0.03
Pyrite*20	5	1.80	2.60
SUM	278	100	100.00

TABLE 75b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #9, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	4	1.28	0.26
Kaolinite*8	2	0.64	0.21
Dolomite	12	3.83	3.70
Szomolnokite*2	2	0.64	0.08
Jarosite	1	0.32	0.76
Illite*4	55	17.57	15.66
Calcite*5.	24	7.67	14.14
Quartz*7	43	13.74	7.23
Tourmaline	2	0.64	0.77
Plagioclase*29	107	34.19	19.04
Biotite*27	1	0.32	0.06
Hornblende*24	21	6.71	8.39
Ankerite*25	7	2.24	1.27
Epidote*24	2	0.64	0.41
Apatite*14	1	0.32	0.02
Almandine	4	1.28	0.30
Andradite*24*25	12	3.83	25.51
Halite	1	0.32	0.15
Sulphur*18	6	1.92	0.17
Pyrite*20	5	1.60	1.40
Arsenopyrite	1	0.32	0.48
SUM	313	100	100.00

TABLE 76a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #10, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	5	1.38	1.14
Kaolinite#8	3	0.83	0.57
Dolomite	9	2.49	2.91
Szomolnokite#2	1	0.28	0.66
Illite#4	81	22.38	19.92
Calcite#5.	20	5.52	6.24
POLISH#6	1	0.28	0.30
Quartz#7	34	9.39	10.67
Chlorite#9	1	0.28	0.32
Tourmaline	7	1.93	1.82
Plagioclase#29	151	41.71	41.61
Biotite#27	1	0.28	0.02
Hornblende#24	14	3.87	2.69
Diopside#22	1	0.28	0.18
Ankerite#25	3	0.83	0.92
Epidote#24	4	1.10	2.99
Almandine	4	1.10	0.82
Andradite#24#25	14	3.87	4.28
Sulphur#18	2	0.55	0.16
Pyrite#20	6	1.66	1.77
SUM	362	100	100.00

TABLE 76b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #10, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	4	2.16	0.25
Dolomite	9	4.86	1.06
Illite#4	26	14.05	7.89
Calcite#5.	13	7.03	10.86
Quartz#7	14	7.57	2.19
Tourmaline	1	0.54	0.04
Plagioclase#29	77	41.62	40.84
Biotite#27	3	1.62	0.11
Hornblende#24	15	8.11	2.53
Microcline#10	1	0.54	0.23
Diopside#22	1	0.54	0.27
Ankerite#25	3	1.62	0.71
Epidote#24	3	1.62	0.42
Augite#22	1	0.54	0.09
Almandine	3	1.62	30.21
Andradite#24#25	6	3.24	1.42
Sulphur#18	3	1.62	0.57
Pyrite#20	2	1.08	0.31
SUM	185	100	100.00

TABLE 77a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #11, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Bischofite	1	0.25	0.02
Gypsum#1	8	1.99	0.69
Kaolinite*8	5	1.24	0.53
Dolomite	13	3.23	3.11
Szomolnokite*2	1	0.25	0.05
Illite#4	93	23.13	30.40
Calcite*5.	21	5.22	4.59
POLISH#6	1	0.25	0.09
Quartz*7	45	11.19	13.02
Chlorite*9	2	0.50	0.21
Tourmaline	5	1.24	0.82
Plagioclase*29	144	35.82	32.62
Hornblende*24	27	6.72	9.16
Ankerite*25	3	0.75	0.34
Epidote*24	7	1.74	1.10
Apatite*14	2	0.50	0.21
Augite*22	1	0.25	0.04
Sphene	2	0.50	0.16
Almandine	4	1.00	0.84
Andradite*24*25	13	3.23	1.44
Sulphur*18	2	0.50	0.07
Pyrite*20	2	0.50	0.50
SUM	402	100	100.00

TABLE 77b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Table Sample #11, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.51	0.08
Kaolinite*8	5	1.29	2.76
Dolomite	12	3.08	1.64
Illite#4	74	19.02	21.90
Calcite*5.	28	7.20	7.91
POLISH#6	1	0.26	0.03
Quartz*7	52	13.37	12.95
Chlorite*9	2	0.51	0.05
Tourmaline	5	1.29	0.24
Plagioclase*29	151	38.82	37.13
Hornblende*24	20	5.14	2.83
Ankerite*25	2	0.51	0.29
Epidote*24	6	1.54	0.72
Apatite*14	1	0.26	0.07
Augite*22	1	0.26	0.03
Almandine	2	0.51	0.53
Andradite*24*25	15	3.86	9.60
Sulphur*18	2	0.51	0.40
Barite	1	0.26	0.04
Pyrite*20	7	1.80	0.81
SUM	389	100	100.00

TABLE 78a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Table Sample #12, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	5	1.27	0.49
Kaolinite#8	5	1.27	1.65
Dolomite	11	2.79	6.33
Szomolnokite#2	2	0.51	0.79
Jarosite	1	0.25	0.19
Illite#4	67	17.01	15.99
Calcite#5.	27	6.85	5.05
Quartz#7	68	17.26	15.74
Tourmaline	8	2.03	0.63
Plagioclase#29	148	37.56	38.71
Biotite#27	1	0.25	0.02
Hornblende#24	17	4.31	1.95
Ankerite#25	2	0.51	0.05
Epidote#24	4	1.02	0.20
Siderite#12	1	0.25	0.04
Apatite#14	4	1.02	1.57
Andradite#24#25	11	2.79	3.32
Rutile#13	2	0.51	1.53
Sulphur#18	3	0.76	0.68
Pyrite#20	7	1.78	5.07
SUM	394	100	100.00

TABLE 78b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Table Sample #12, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	3	0.69	0.31
Kaolinite#8	5	1.15	0.14
Dolomite	17	3.93	12.39
Illite#4	73	16.86	14.49
Calcite#5.	29	6.70	5.85
Quartz#7	81	18.71	15.16
Chlorite#9	1	0.23	0.03
Tourmaline	8	1.85	1.44
Plagioclase#29	146	33.72	27.47
Biotite#27	2	0.46	0.58
Hornblende#24	20	4.62	2.20
Ankerite#25	3	0.69	0.13
Epidote#24	4	0.92	0.34
Siderite#12	2	0.46	1.45
Apatite#14	4	0.92	0.24
Sphene	1	0.23	0.10
Almandine	2	0.46	6.23
Andradite#24#25	15	3.46	6.95
Sulphur#18	8	1.85	0.54
Pyrite#20	8	1.85	3.81
Linnaeite	1	0.23	0.13
SUM	433	100	100.00

TABLE 79a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Table Sample #13, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	3	1.09	0.40
Kaolinite*8	1	0.36	0.30
Dolomite	16	5.80	3.28
Illite*4	40	14.49	7.68
Calcite*5.	23	8.33	16.54
Quartz*7	40	14.49	13.32
Tourmaline	3	1.09	4.25
Plagioclase*29	99	35.87	41.95
Hornblende*24	18	6.52	3.05
Ankerite*25	3	1.09	0.45
Epidote*24	5	1.81	0.91
Siderite*12	1	0.36	0.36
Apatite*14	1	0.36	0.18
Almandine	1	0.36	0.19
Andradite*24*25	12	4.35	1.71
Sulphur*18	3	1.09	0.10
Pyrite*20	7	2.54	5.33
SUM	276	100	100.00

TABLE 79b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #13, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum*1	10	2.56	1.87
Kaolinite*8	3	0.77	1.22
Montmorillonite	1	0.26	0.04
Dolomite	18	4.60	16.01
Szomolnokite*2	1	0.26	0.07
Illite*4	61	15.60	17.21
Calcite*5.	31	7.93	10.35
POLISH#6	2	0.51	0.07
Quartz*7	37	9.46	6.70
Tourmaline	6	1.53	1.01
Plagioclase*29	159	40.66	28.15
Hornblende*24	18	4.60	7.36
Ankerite*25	8	2.05	1.00
Epidote*24	3	0.77	0.21
Siderite*12	1	0.26	0.16
Augite*22	1	0.26	0.09
Almandine	3	0.77	0.62
Andradite*24*25	15	3.84	6.15
Sulphur*18	4	1.02	0.99
Pyrite*20	8	2.05	0.65
Chalcopyrite*21	1	0.26	0.07
SUM	391	100	100.00

TABLE 80a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #14, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	3	1.53	0.67
Kaolinite#8	6	3.06	0.59
Dolomite	2	1.02	0.68
Illite#4	27	13.78	11.68
Calcite#5.	11	5.61	4.24
POLISH#6	2	1.02	0.13
Quartz#7	26	13.27	11.78
Chlorite#9	1	0.51	0.24
Tourmaline	3	1.53	0.42
Plagioclase#29	80	40.82	45.97
Hornblende#24	16	8.16	13.51
Ankerite#25	2	1.02	0.25
Epidote#24	5	2.55	0.92
Apatite#14	1	0.51	1.48
Almandine	1	0.51	0.06
Andradite#24#25	8	4.08	6.47
Pyrite#20	2	1.02	0.90
SUM	196	100	100.00

TABLE 80b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #14, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	8	2.01	0.73
Kaolinite#8	3	0.75	0.15
Montmorillonite	2	0.50	0.03
Dolomite	18	4.52	1.37
Illite#4	77	19.35	21.31
Calcite#5.	32	8.04	17.43
Quartz#7	49	12.31	12.69
Chlorite#9	1	0.25	0.02
Tourmaline	6	1.51	0.90
Plagioclase#29	129	32.41	33.82
Hornblende#24	12	3.02	1.75
Ankerite#25	11	2.76	1.86
Epidote#24	7	1.76	1.50
Siderite#12	2	0.50	0.44
Apatite#14	2	0.50	2.91
Andradite#24#25	25	6.28	2.41
Sulphur#18	5	1.26	0.09
Pyrite#20	9	2.26	0.59
SUM	398	100	100.00

TABLE 81a. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #15, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.56	0.12
Kaolinite*8	4	1.11	0.96
Dolomite	7	1.95	0.74
Jarosite	1	0.28	0.32
Illite*4	49	13.65	12.46
Calcite*5.	23	6.41	11.56
POLISH#6	1	0.28	0.04
Quartz*7	59	16.43	22.32
Tourmaline	1	0.28	0.08
Plagioclase*29	147	40.95	33.73
Biotite*27	1	0.28	0.10
Hornblende*24	11	3.06	1.01
Ankerite*25	5	1.39	2.64
Epidote*24	7	1.95	3.44
Siderite*12	2	0.56	0.21
Apatite*14	1	0.28	0.03
Augite*22	1	0.28	0.03
Almandine	5	1.39	0.44
Andradite*24*25	18	5.01	6.63
Halite	1	0.28	0.02
Sulphur*18	4	1.11	0.85
Pyrite*20	9	2.51	2.29
SUM	359	100	100.00

TABLE 81b. Interpretative analysis summary of mineral classes and weight percentages for Jigging Test Sample #15, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	8	2.23	0.43
Kaolinite*8	3	0.84	0.14
Montmorillonite	3	0.84	0.09
Dolomite	9	2.51	0.40
Szomolnokite*2	1	0.28	0.26
Staurolite	1	0.28	0.48
Illite*4	60	16.76	21.25
Calcite*5.	27	7.54	11.78
Quartz*7	40	11.17	8.14
Tourmaline	7	1.96	1.62
Plagioclase*29	126	35.20	32.72
Biotite*27	3	0.84	0.44
Hornblende*24	19	5.31	1.74
Microcline*10	3	0.84	1.14
Ankerite*25	3	0.84	0.41
Epidote*24	4	1.12	0.69
Apatite*14	2	0.56	2.67
Augite*22	4	1.12	0.20
Almandine	3	0.84	4.46
Andradite*24*25	22	6.15	3.43
Rutile*13	1	0.28	0.85
Sulphur*18	4	1.12	1.52
Pyrite*20	5	1.40	5.13
SUM	358	100	100.00

TABLE 82a. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #16, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	5	1.39	0.45
Kaolinite*8	8	2.22	2.51
Dolomite	5	1.39	1.12
Illite*4	76	21.11	9.14
Calcite*5.	22	6.11	5.73
POLISH*6	4	1.11	0.13
Quartz*7	27	7.50	7.70
Chlorite*9	2	0.56	0.05
Tourmaline	6	1.67	1.14
Plagioclase*29	143	39.72	38.03
Biotite*27	1	0.28	0.04
Hornblende*24	21	5.83	9.14
Ankerite*25	2	0.56	6.35
Epidote*24	5	1.39	2.68
Apatite*14	2	0.56	1.43
Almandine	1	0.28	0.01
Andradite*24*25	19	5.28	13.17
Sulphur*18	6	1.67	0.67
Pyrite*20	5	1.39	0.50
SUM	360	100	100.00

TABLE 82b. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #16, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.88	0.09
Kaolinite*8	3	0.88	1.36
Dolomite	10	2.92	6.87
Szomolnokite*2	2	0.58	0.19
Staurolite	1	0.29	0.02
Illite*4	73	21.35	26.30
Calcite*5.	18	5.26	17.47
POLISH*6	1	0.29	0.02
Quartz*7	22	6.43	6.62
Tourmaline	10	2.92	11.25
Plagioclase*29	146	42.69	20.32
Biotite*27	1	0.29	0.04
Hornblende*24	18	5.26	3.76
Ankerite*25	3	0.88	1.76
Epidote*24	3	0.88	0.88
Siderite*12	1	0.29	0.05
Apatite*14	2	0.58	0.13
Almandine	5	1.46	0.44
Andradite*24*25	11	3.22	0.79
Sulphur*18	6	1.75	1.03
Pyrite*20	3	0.88	0.62
SUM	342	100	100.00

TABLE 83a. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #17, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	2	0.63	0.17
Kaolinite#8	2	0.63	0.19
Dolomite	6	1.88	2.04
Illite#4	43	13.48	10.58
Calcite#5.	15	4.70	19.23
POLISH#6	1	0.31	0.04
Quartz#7	41	12.85	23.45
Chlorite#9	3	0.94	0.14
Tourmaline	8	2.51	1.89
Plagioclase#29	123	38.56	24.26
Hornblende#24	18	5.64	4.97
Microcline#10	3	0.94	1.75
Ankerite#25	4	1.25	1.22
Epidote#24	6	1.88	1.23
Siderite#12	1	0.31	0.16
Apatite#14	3	0.94	2.04
Augite#22	1	0.31	0.06
Almandine	2	0.63	0.19
Andradite#24#25	16	5.02	2.66
Halite	1	0.31	0.01
Sulphur#18	5	1.57	0.24
Pyrite#20	15	4.70	3.49
SUM	319	100	100.00

TABLE 83b. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #17, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED ### WT %
Gypsum#1	9	2.59	0.64
Kaolinite#8	2	0.57	3.75
Montmorillonite	1	0.29	0.04
Dolomite	11	3.16	0.68
Jarosite	1	0.29	0.47
Illite#4	50	14.37	4.75
Calcite#5.	38	10.92	26.79
Quartz#7	44	12.64	13.96
Tourmaline	4	1.15	0.20
Plagioclase#29	122	35.06	27.87
Hornblende#24	19	5.46	3.81
Microcline#10	1	0.29	1.15
Ankerite#25	7	2.01	1.11
Epidote#24	4	1.15	8.16
Siderite#12	3	0.86	0.30
Apatite#14	1	0.29	0.02
Almandine	4	1.15	0.96
Andradite#24#25	15	4.31	2.16
Sulphur#18	3	0.86	0.07
Pyrite#20	9	2.59	3.09
SUM	348	100	100.00

TABLE 84a. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #18, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	8	2.35	1.20
Kaolinite#8	4	1.18	0.85
Dolomite	8	2.35	3.41
Jarosite	1	0.29	0.53
Illite#4	60	17.65	12.24
Calcite#5.	32	9.41	14.37
POLISH#6	1	0.29	0.03
Quartz#7	47	13.82	12.91
Tourmaline	4	1.18	1.86
Plagioclase#29	126	37.06	37.10
Hornblende#24	7	2.06	1.67
Ankerite#25	6	1.76	2.79
Epidote#24	10	2.94	4.60
Almandine	1	0.29	0.31
Andradite#24#25	14	4.12	2.74
Sulphur#18	1	0.29	0.30
Pyrite#20	9	2.65	2.81
Chalcopyrite#21	1	0.29	0.28
SUM	340	100	100.00

TABLE 84b. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #18, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum#1	6	1.87	0.78
Kaolinite#8	1	0.31	0.03
Dolomite	10	3.12	1.96
Szomolnokite#2	2	0.62	1.14
Staurolite	1	0.31	0.08
Illite#4	70	21.81	14.01
Calcite#5.	12	3.74	2.41
Quartz#7	40	12.46	12.67
Chlorite#9	1	0.31	0.03
Tourmaline	8	2.49	0.70
Plagioclase#29	113	35.20	45.77
Biotite#27	1	0.31	0.22
Hornblende#24	19	5.92	10.11
Microcline#10	2	0.62	0.19
Ankerite#25	7	2.18	3.14
Epidote#24	2	0.62	0.68
Siderite#12	1	0.31	0.22
Augite#22	1	0.31	0.03
Sphene	1	0.31	0.19
Almandine	2	0.62	0.54
Andradite#24#25	15	4.67	3.69
Sulphur#18	3	0.93	0.04
Pyrite#20	3	0.93	1.36
SUM	321	100	100.00

TABLE 85a. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #19, Concentrate.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	2	0.99	0.24
Kaolinite*8	1	0.50	0.84
Dolomite	3	1.49	1.76
Szomolnokite*2	1	0.50	1.11
Illite*4	41	20.30	36.26
Calcite*5.	15	7.43	14.23
Quartz*7	21	10.40	3.36
Tourmaline	2	0.99	1.44
Plagioclase*29	80	39.60	11.35
Biotite*27	2	0.99	3.43
Hornblende*24	12	5.94	7.85
Ankerite*25	2	0.99	3.60
Epidote*24	3	1.49	5.64
Almandine	4	1.98	3.17
Andradite*24*25	8	3.96	1.57
Sulphur*18	1	0.50	0.65
Pyrite*20	3	1.49	1.07
Realgar*17	1	0.50	2.43
SUM	202	100	100.00

TABLE 85b. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #19, Tails.

MINERAL CLASS	P.R.C. #	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	4	1.92	1.18
Kaolinite*8	2	0.96	0.08
Dolomite	6	2.88	5.80
Illite*4	38	18.27	37.69
Calcite*5.	16	7.69	7.03
Quartz*7	28	13.46	13.03
Tourmaline	5	2.40	0.57
Plagioclase*29	78	37.50	25.61
Hornblende*24	13	6.25	4.05
Ankerite*25	1	0.48	0.02
Epidote*24	2	0.96	0.22
Siderite*12	1	0.48	0.29
Andradite*24*25	10	4.81	3.58
Sulphur*18	1	0.48	0.09
Pyrite*20	3	1.44	0.76
SUM	208	100	100.00

TABLE 86a. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #20, Concentrate.

MINERAL CLASS	P.R.C. # 	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	3	0.98	0.15
Kaolinite*8	5	1.64	0.15
Montmorillonite	1	0.33	0.05
Dolomite	7	2.30	1.22
Staurolite	1	0.33	0.03
Illite*4	54	17.70	22.37
Calcite*5.	15	4.92	5.95
POLISH#6	2	0.66	0.03
Quartz*7	35	11.48	11.26
Chlorite*9	2	0.66	0.05
Tourmaline	12	3.93	2.03
Plagioclase*29	122	40.00	40.17
Hornblende*24	19	6.23	3.08
Diopside*22	1	0.33	0.15
Ankerite*25	1	0.33	0.52
Epidote*24	3	0.98	0.19
Siderite*12	1	0.33	2.89
Apatite*14	3	0.98	2.32
Augite*22	1	0.33	0.02
Almandine	1	0.33	0.08
Andradite*24*25	12	3.93	7.22
Sulphur*18	3	0.98	0.05
Pyrite*20	1	0.33	0.02
SUM	305	100	100.00

TABLE 86b. Interpretative analysis summary of mineral classes and weight percentages for: Jigging Test Sample #20, Tails.

MINERAL CLASS	P.R.C. # 	NORMALIZED MINERALS # %	NORMALIZED *** WT %
Gypsum*1	6	1.46	0.66
Kaolinite*8	2	0.49	0.95
Montmorillonite	1	0.24	0.01
Dolomite	10	2.43	1.62
Illite*4	57	13.87	6.97
Calcite*5.	31	7.54	30.35
Quartz*7	48	11.68	6.07
Tourmaline	8	1.95	17.04
Plagioclase*29	164	39.90	20.84
Biotite*27	1	0.24	0.03
Hornblende*24	29	7.06	3.41
Microcline*10	1	0.24	0.13
Ankerite*25	5	1.22	1.22
Epidote*24	6	1.46	0.40
Siderite*12	5	1.22	0.20
Almandine	5	1.22	1.96
*24*25	12	2.92	2.18
Rutile*13	1	0.24	0.02
Sulphur*18	6	1.46	1.35
Pyrite*20	13	3.16	4.59
SUM	411	100	100.00